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STUDY OF FIRE DEPARTMENT NEEDS FOR FIRE STATIONS AND COMPANIES AND UTILIZATION OF MANPOWER FOR THE CITY AND COUNTY OF SAN FRANCISCO

November, 1969

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FOREWORD

Presented herein is a report on a study of the fire department needs for providing a good level of fire station and company coverage, adequate manning of companies, effective organizational structure, and efficient utilization of personnel. The report conclusions, and recommendations reflect conditions as they existed during the data collection phase (July to September, 1969). The cost estimates presented are valid for planning and budget purposes but additional engineering may be needed before the recommendations are implemented to accurately predict costs.

The basic philosophy followed furing the analysis phase of this study is summarized as follows:

The level of fire protection provided by a city should first be able to provide protection sufficient for reasonable fire safety to life and property; beyond this, protection should be within the economic ability and desire of the city to provide this service. San Francisco has demonstrated over the years that a high level of service is desirable.

The standards and rules of the American Insurance Association and the National Fire Protection Association are helpful in determining a reasonable level of property fire protection and have a direct effect on the cost of fire insurance. There are, however, other important factors of a city's fire defenses which are not adequately considered by these standards; some of these factors are protection to life, economic capacity of a city, coordination with other city improvements, and equitable protection to all citizens of the city. In forming the conclusions and recommendations contained in this report, primary consideration was given to effective fire protection for all fire problems in San Francisco, with secondary consideration given to A.I.A. standards and the City's fire department grading.

Louis E. Almgren, P.E., was project engineer for the study and was assisted by C. J. Winquist, Fire Protection Engineer; H. T. Nelson, Fire Protection Engineer, and Gary S. Jensen, Fire Protection Analyst. The report recommendations and conclusions reflect staff concensus.

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REPORT HIGHLIGHTS

OBJECTIVE: To conduct a study of fire department facilities to determine optimum economical need for fire stations, fire companies and personnel consistent with good fire department service.

CONCLUSIONS & RECOMMENDATIONS (listed in order of importance)

1. Reduce the number of engine companies in service from 47 to 33. Reduce the number of truck companies in service from 20 to 16. Increase by one the number of rescue squads in service. Eliminate hose tenders and water tower apparatus.

2. Revise the fire station construction program by selling 22 fire stations, building 6 new fire stations at new locations, rebuilding 3 fire stations on existing sites, and modernizing one station.

3. Adopt a minimum company manpower assignment plan to provide 5 men on engine companies (6 men on 8 engine companies), and 6 men on truck companies. Establish the means of maintaining these minimums during vacation and excessive sickness periods.

4. Implement a fire department reorganizational plan to provide the level of administration and supervision desirable for the new program in addition to implementing important changes.

5. Change the working shift for fire fighters from a single 24 hour shift to split 10 - 14 hour shift, to provide greater productivity and to accomplish needed increases in activities.

6. Revise response assignments and company utilization in order to accomplish greater effectiveness per company.

7. Provide an additional fire boat in service which will be smaller, faster, and more maneuverable than the boat now in service and will provide a better measure of protection to the water front and marina.

8. Revise the promotional procedures to provide oral board review and better selection practices for all fire department positions. Regular medical exams should be conducted and medical retirements required where indicated.

9. Several other areas of fire department operations appear to need further study and show promise of producing additional economic benefits.

ADVANTAGES:

1. The reduction in fire companies in service together with the reorganizational plan will result in an annual savings of approximately $4,000,000 in salary costs and $150,000 in reduced operating costs.

2. Implementation of a revised fire station construction plan at this time could result in the use of approximately $2,500,000 remaining from the previously approved fire station construction bond issue.

3. Reorganization of the fire department organizational structure will improve the overall efficiency of the department as well as initiate new functions which will assist in maintaining fire department efficiency at a high level in the future.

4. Maintaining minimum manpower level on each company in service will result in greater per company effectiveness at an overall reduction in cost.

5. Greater productivity of fire fighting personnel can be accomplished by splitting the 24 - hour shift into 10 and 14 hours, and improved programs for training, fire prevention, maintenance, etc. can be implemented.

LIMITATIONS:

1. The proposed fire station building program (necessary to the reduction in companies) will have an estimate net cost of $3,540,000; subtracting the value of unneeded stations.

2. Splitting the 24 hour shift into a more productive arrangement requires establishing a greater activity level in the fire department in order to take advantage of the increased productivity. An amendment to the City Charter will be necessary prior to implementation.

Recommendation No. 1 FIRE DEPARTMENT COMPANIES

It is the considered conclusion of this study that the San Francisco Fire Department can maintain a high level of service while operating with fewer engine and truck companies. It is recommended that in-service engine companies be gradually reduced from the present 47 companies to an eventual 33 companies. It is further recommended that ladder service truck companies be gradually reduced from the present 20 companies to an eventual 16 companies. Hose companies should be deactivated; and water towers be replaced with elevating platform truck companies (recommended as part of the 16 truck companies). Rescue squads should be increased by one and salvage units, compressor unit, and light truck should remain as presently exists. (See schedule suggested in Recommendation No. 2).

DETAILS OF COMPANY REALLOCATION PLAN

The following companies should be eliminated or reallocated to other fire stations as suggested in the schedule proposed in Recommendation No. 2. Actual disposition of the apparatus should be made on the basis of need for reserve apparatus, age and condition.

Deactivate the following companies:

Engine 4,6,8,9,16,19,23,24,26,33,34,42,46,49
Truck 3,8,9,10
Hose tender 1,4,5,6
Water tower

Relocate the following companies:

Engine 2,3,5,13,32,35,36,37,39,45,47,48
Truck 2,5,8,11,14,15,18,20
Salvage 1,4
Rescue 2
Light wagon
Air Compressor

Allocate the following additional companies to the fire stations indicated:

Station No. 1 -Add Engine Co.
Station No. 10 -Add Engine Co.
Station No. 14 -Add Truck & Rescue
Station No. 15 -Add Engine & Truck Co.
Station No. 17 -Add Salvage Co.
Station No. 19 -Add Salvage Co.
Station No. 43 -Add Truck Co.

Reserve apparatus should be maintained in the following numbers:

Engines - 6
Truck - 3
Salvage - 1
Rescue - 1

The following companies should be allocated to the new fire stations (at new locations).

Pennsylvania & 22nd	- Engine, Elev. Plat., Salvage Co.
Oakdale & Loomis	- Engine & Elev. Plat.
Bryant & 2nd	- Two Engines, Elev. Plat., Light Wagon
Dwight & San Bruno	- Engine Co.
Geary & 34th	- Engine & Truck Co.
Portola & Twin Peaks	- Engine & Truck Co.

See Table No. 10 in Appendix Section for composite details of Station and Company disposition.

SUPPLEMENTARY INFORMATION

Historical Background of Fire Defense System

Since shortly after the 1906 disaster the fire defense system has been improved and maintained at a high level. Although it is only speculation as to what could happen should a similar disaster occur today, it is quite clear that the damage caused by fire would be considerably less.

Reduced damage should result from improvements in several important contributary aspects of the fire damage potential, as described in the following paragraphs.

Building Construction:
The damaged building factor relates to the fire loss potential in three ways, (1) debris limits the mobility of fire fighting forces, (2) fire spreads at a greater pace through and between damaged buildings, and (3) disruption of utilities within the building structure which could initiate a fire. Since 1906 building laws relating to earthquake protection have been enacted and strictly enforced. There are far more fire resistive buildings and far fewer wood frame buildings in the congested high value district than in 1906. The old type buildings, which were so prevalent and sustained considerable damage in 1906, have essentially disappeared.

Heating and Lighting:
Installation standards for both electricity and gas have significantly improved since 1906. However, the most important factor in this regard is the elimination of the use of kerosene and other flamable liquids for heating and lighting. This source alone accounted for a large number of ignitions during the earthquake.

Fire Department:
The 1906 San Francisco Fire Department was fairly well equipped and manned compared to other U.S. cities at that time. However, it was a far cry from the larger, modern fire department which exists today. The effectiveness of fire fighting operations should have a substantial effect on limiting fire damage.

Water Supply:
In 1906 the water system was of no value in fire fighting efforts. Damage to the system was severe and repairs required an extended period to accomplish. Today the City has three water facilities available for fire fighting forces, (1) domestic water system, (2) high pressure fire system built specifically to withstand earthquake forces, and (3) a system of large water cisterns below the streets. This reliable system together with a vastly improved fire fighting organization presents an entirely different fire control picture than that which previously existed.

Potential for Loss of Life and Property from Fire

Life Loss Potential:
The threat to life safety is judged against what is normally accepted. Since all buildings used by people are a potential exposure and threat to loss of life, the magnitude of the threat is judged by comparing existing conditions with life safety provisions of modern building standards. Life safety is discussed, therefore, in relative terms, where the threat is above normal, and the number of people exposed is more than a few.

Probably the most difficult aspect of fire protection for the public to understand is the fundamental difference between protection of life and protection of property from fire. Public comprehension is further complicated by the fact that fire department response and fire attack appear the same whether

fire fighting involves primarily life saving or property protection. Protection of life, however, differs in a few important respects from the protection of property, and this should be understood before the level of fire protection in San Francisco is evaluated.

There have been many fires where property damage has been relatively low, but where several lives have been lost and where many injuries have occurred. When discovery of a fire is delayed, response of the fire department may not be a factor in protecting people from the effects of heat and smoke. The basic principles of protection of life from fire are (1) prompt fire detection, (2) notification of occupants, and (3) adequate exit facilities. If sufficient attention is given to these fundamentals of building design, fire department activities take on a minor role due only to unusual circumstances where people become confused and trapped. However, the ideal condition seldom exists, and the fire department's role in life safety from fire is important.

Buildings which usually have a higher loss-of-life potential are those in which the number of occupants is high or in which evacuation of occupants is normally difficult. Buildings open to the public are in this category, as are schools, hospitals, nursing homes, penal institutions, hotels, apartments, auditoriums and large office buildings.

Buildings in San Francisco which represent a considerable exposure to loss of life fit into three basic categories; (1) High rise buildings where a large number of people are confined within the structure, (2) places of public assemblage, and (3) residential and apartment type buildings generally 4 stories or greater.

Drawing No. 7004-6 is designed to show the location and concentration of high rise buildings in San Francisco. The occupancy map, Drawing No. 7004-1, illustrated the location of residential properties. The field work phase of this project included an examination of all districts of San Francisco and a cataloging of life safety fire fighting problems. The company distribution plan proposed anticipates the unusual demands on the fire department imposed by these problems as well as the effect the hilly terrain has on response times.

Loss of Property From Fire

Although block congestion in the high value business areas of San Francisco is considerable, the quality of building construction is generally good. It is improbable that a fire could spread between buildings although losses within any high rise structure could be considerable. The complications in fighting fires in high rise building areas are many. However, the demand on fire companies and manpower is not excessive. Some of the smaller business areas could cause considerable demands on the fire department because structural conditions may readily permit building to building fire spread.

The industrial districts consist basically of large-area buildings of non-combustible construction, many housing hazardous processes. Building heights range from one to six stories. Many industrial plants are protected by automatic sprinklers. In general, sufficient quantities of water for fire fighting are available. Hydrant coverage is adequate in most areas. Severe individual fire losses will occur in the industrial areas, particularly in unsprinklered buildings and in those involving hazardous processes. Sweeping fires between buildings are a slight to moderate possibility; depending largely on building construction and congestion in the district.

The demands on fire department service can be considerable if a fire gains a considerable headway before being reported to the fire department. Under this type of adverse conditions, fires in congested industrial areas will require most of the resources of the fire department to gain control.

Residential properties present a lesser problem in many areas of the City. However, there is a large portion of the City which consists of "row" houses continuing uninterrupted through the block. Fires in these buildings present a considerable fire fighting problem because of life safety evacuation and poor access for fire fighters.

Summary:
The largest demands on the fire department have been and will be created by industrial fires occurring in congested industrial areas where the alarms are delayed or the fire progress is accelerated. These extreme demands will be a strain on the fire department. However, with efficient use of companies and back-up use of off-shift, as presently practiced, there will be no danger of the fire department service being inadequate to control the fire problem. The greatest danger will be the availability of companies for response to a large simultaneous fire which may occur during high demand fires. With adequate planning, controlled response allocations, and efficient use of company capabilities there should be few or no problems encountered.

Need for Fire Department Companies:

In years following the earthquake disaster a pattern for development and maintenance of the City's fire defense system was established. Basically this pattern is still the predominant factor in the decision making and planning process of the fire department.

For some time now the fire defense system has been maintained at a high level in spite of the fact that other factors influencing the fire potential have improved. It is appropriate to reevaluate all of these factors as a single problem and assess the present needs in light of improvements in all segments of the fire defense system.

It has been previously pointed out the fire defense system is composed of many factors, all interrelated. Basically the factors fall into four main groups:

(1) Water supply for fire fighting
(2) Fire fighting organization
(3) Fire alarm notification
(4) Structural and fire hazard conditions which can contribute to the fire potential.

Each of these primary factors have many sub-factors and the relationship between them is complex. It is obvious, therefore, that there is an interrelationship wherein a change in one factor or sub-factor will have an influence on the other factors if the over-all level of protection is to be maintained.

Also quite clear, is the premise that if structural conditions and fire hazards are improved the need for counteracting forces (fire control) diminishes. The structural and fire hazard conditions have significantly improved since 1906; the need for fire control forces should be less. Improvement in fire department equipment, apparatus, communications, and operations should also be considered in evaluating present needs. Countering this trend is the avalanche of new hazards brought on by new technology. Nevertheless the modern company fire fighting unit can control more fire today that the fire company which existed as recently as 20 years ago.

Within the last ten years there has been decided improvement in the assistance provided by neighboring cities and the state during major disasters. Of course this aid requires time to assemble and is only useful during major disasters where the need for aid occurs over an extended period of time (over 8 hours). In any event a considerable number of men and apparatus is now available, should a major fire disaster occur.

All of these considerations indicate that the requirements for the City's fire defense system today would be quite different than that needed 60 years ago. It is the conclusion of this study that the number of fire department companies recommended for service is in excess of what is needed to provide a minimum acceptable level of service and sufficient to maintain services at a high level. This conclusion is largely based on the fact that fewer fire department companies properly manned and effectively employed can provide the same comparable level of service as that provided by a larger number of companies with less per company manning and less efficient deployment and utilization of these companies.

AIA Grading Requirements:

The proposed program outlined by the recommendations and illustrated on Drawings Nos. 7004-4 and 7004-5, was developed with full consideration of the standards of the American Insurance Association. In addition, the basic requirements of the AIA, as they would apply specifically to San Francisco, were reviewed with AIA engineers. The program as outlined basically satisfies AIA requirements with only minor deficiencies. The net deficiency points for the grading items affected will remain about the same as graded by AIA in 1966, with some improvement as summarized below (for specific grading item details, refer to the Appendix Section).

Fire Department Section:

The proposed reallocation of fire stations and companies will have little or no effect on the grading of companies and manpower. Changes proposed in the organizational structure will improve the grading in items dealing with supervision. The proposed changes in the Training Section should produce grading improvements in this area. The recommended fire boat addition will certainly improve this aspect of the grading; however, AIA credit for the smaller type boat may be questionable. No doubt some limited credit will be given.

Fire Prevention Section:

The reorganization and increased staffing for the fire prevention bureau will improve the grading in this section. Although this improvement can produce considerable grading point reduction, full implementation will require several years of operation to produce the maximum effects.

Recommendation No. 2 FIRE STATIONS

The present 49 fire stations serving the City and the airport are more than a sufficient number to provide adequate coverage. It is recommended that the companies be redistributed as shown on Drawing No. 7004-4 and that the recommended fire station plan be adopted. In addition, the remaining outdated fire stations should be rebuilt on the existing site and/or modernized.

The complete program will result in building 6 new stations at new locations, rebuilding 3 stations at present locations and modernizing 1 station. Estimated total construction cost will be $4,430,000. This cost can be partially reduced by the sale of 22 fire stations and use of the remaining fire station construction bond issue; total reduction is estimated at $4,540,000. The net additional cost would then be $1,040,000.

DETAILS OF FIRE STATION PLAN

The following fire stations and property should be sold and the apparatus and equipment reallocated to other stations. Excess apparatus to be placed in reserve or sold as determined by age and condition.

Stations Nos. 2*, 3, 4, 5, 6, 8, 13, 16, 18, 23, 32, 33, 34, 35, 36, 37, 39, 42, 45, 47, 48, and 49.

(Station No. 26 used for museum)
Total Estimate Resale Value $890,000
*Station No. 2 is on a rental basis.

New fire stations should be constructed at the following general locations (see Recommendation No. 1 for companies to be housed at these locations).

Pennsylvania & 22nd
Oakdale & Loomis
Bryant & 2nd

Dwight & San Bruno
Geary & 34th
Portola & Twin Peaks

Estimated total cost of new stations and property - $3,240,000.

New fire stations are needed on existing sites at the following locations:

Station No. 24
Station No. 19
Station No. 46

Estimated total cost of stations and additional property: $1,170,000

Remodelling is needed to station No. 9: 20,000

Summary of Fire Station Costs:

Cost of new or modernized fire stations	-	$4,430,000
Resale of excess fire stations	-	890,000
Net Cost of Fire Station Program	-	$3,540,000
Estimated Station Construction Funds Remaining in Past Bond Issue	-	2,500,000
Net Additional Funds Needed for Program		$1,040,000

The following improvement program is suggested as one way to implement a gradual adjustment of the number of companies in service and the personnel assigned, and provide for natural attrition for reducing the fire department personnel. Further study and consideration of other factors not included within the scope of this study possibly could reveal other implementation schedules which may reduce the transition problems.

SUGGESTED IMPLEMENTATION SCHEDULE

Note: Apparatus can more economically be sold in groups rather than individually as implied by this schedule.

	Excess or Reallocated Manpower (on duty)
1. Relocate Eng. 2 to Station 10	
Sell Hose Tender 6	1
Sell Hose Tender 1	1
Relocate Salvage 4 to Station No. 17	
2. Purchase new station sites	
Vicinity of: 2nd & Bryant	
22nd & Pennsylvania	
Dwight & San Bruno	
34th & Geary	
Portola & Twin Peaks	
Oakdale & Loomis	
3. Sell Station No. 3	
Relocate Eng. 3 to Station No. 1	
Deactivate Truck 3	6
4. Build Station vicinity of 2nd & Bryant	
Sell Station No. 5	
Relocate Eng. 5 to new station	
Relocate Truck 2 to new station	
5. Sell Station No. 35	
Relocate Engine 35 to 2nd & Bryant	
Deactivate Truck 8	6
Sell Hose Tender 4	1
Relocate light wagon to 2nd & Bryant	

	Excess or Reallocated Manpower (on duty)
6. Build Station vicinity of Oakdale & Loomis Sell Station No. 32 Relocate Engine 32 to new station Relocate Truck 8 to new station	
7. Build Station vicinity of 22nd & Pennsylvania Sell Station No. 48 & No. 16 Relocate Engine 48 to new station Deactivate Engine 16	4
8. Sell Station No. 6 Deactivate Engine 6 Reallocate Salvage 1 to 22nd & Penn. Reallocate Truck 5 to 22nd & Penn.	5
9. Sell Station No. 8 Deactivate Engine 8	5
10. Purchase 3 Elevating Platform Apparatus and locate at 3 new stations and replace existing trucks in service.	
11. Build new station vicinity 34th & Geary Sell Station No. 47 Relocate Truck 14 to new station Relocate Engine 47 to new station	
12. Rebuild Station No. 46 Deactivate Engine 46	5
13. Sell Station 36 Relocate Engine 36 to Station 46	

	Excess or Reallocated Manpower (on duty)
14. Sell Station No. 42 and No. 45 Relocate Rescue 2 to Station 14 Relocate Engine 45 to Station 15 Deactivate Engine 42	5
15. Sell Station No. 49 Deactivate Engine 49	5
16. Modernize Station No. 9 Deactivate Engine 9	5
17. Purchase new fire boat	
18. Sell Hose Tender 5 Relocate Salvage 4 to Station No. 17	1
19. Purchase additional rescue truck and locate at Station 14	
20. Rebuild Station No. 24 Deactivate Engine 24	4
21. Sell Station No. 13 Relocate Engine 13 to Station No. 24 Relocate Truck 11 to Station No. 14	
22. Rebuild Station No. 19 Deactivate Engine 19 Relocate Air Comp. to Station No. 37 Sell Water Tower	4
23. Sell Station No. 34 Relocate Eng. 37 to Station 19 Deactivate Truck 9	6

	Excess or Reallocated Manpower (on duty)
24. Build new station vicinity of Dwight & San Bruno Sell Station No. 18 Relocate Engine 18 to new station	
25. Sell Station no. 34 & No. 4 Deactivate Engine 34 & Engine 4	10
26. Build new station vicinity of Portola and Twin Peaks Sell Station No. 23 and No. 39 Deactivate Engine 23 Relocate Engine 39 to new station Relocate Truck 20 to new station	4
27. Sell Station No. 33 Deactivate Engine 33 Relocate Truck 15 to Station No. 43	4
28. Deactivate Engine 26 and Truck 10	11

Table No. 10 in the Appendix Section presents the composite summary of the disposition of existing stations and companies, new stations needed and on duty personnel changes.

SUPPLEMENTARY INFORMATION

Station Locations:

Fire station locations are largely determined by the needs for prompt company response in all areas of the City. Drawings Nos. 7004-4 and 7004-5 illustrate the locations suggested for engine and truck companies. The exact location of new station sites should be determined only after additional study of traffic patterns, future development projects and access routes.

The locations recommended should be considered as vicinity locations and several other considerations (primarily cost and street access) may dictate acquisition of a site several blocks from that indicated by this study.

Station Facilities:

In the past, fire station design has been carefully considered and the stations constructed have well served the needs of the fire department. However, there are a few station facilities which have been overlooked and are important for implementing effective fire department programs. It is urged that future fire station planning include the facilities enumerated below. Plate No. 21 in the Appendix Section presents a typical fire station arrangement which includes most of the features found in present fire stations and the new features considered desirable.

Entry Area:

Although the public does not frequently enter a fire station, it is desirable that a public entrance be defined and that the public feel welcome to enter. It is important that the public not have immediate access to the living area of the station. Therefore, an entrance area should be provided which has the surveillance of the station watch without direct intrusion into the living area of the station. This is best provided by having the public entrance in conjunction with the Captain's and the Chief's offices at the front of the fire station.

Physical Training Area:

Most of the on-duty firemen are physically active only when drilling or fire fighting. This can result in the men being in poor physical trim and the incidence of minor physical injury should be higher than normal. It is important to

conduct an active department physical training program to insure physical fitness, thereby reducing the possibility of injuries and maintaining morale at a good level. In addition to providing sufficient room for calisthenics and daily exercise, facilities are needed for recreational exercise. The type of exercise facility provided would depend on the area available and each station should be separately considered. The types of activity which should be considered as adaptable to fire station operations are listed below:

(1) Hand ball.
(2) Volley ball
(3) Basket ball
(4) Gymnastics (some types).

Training Area:

Each day each company should be engaged in some form of drill involving use of equipment. Many times drills can be conducted on the apparatus floor or in a classroom provided at the station. Frequently, however, the drill may involve the use of larger equipment and conducting the drill inside is not practical. In most areas of San Francisco, conducting this type of drill outside on the public street is not feasible. Drills can be conducted at the drill ground provided at Station No. 10. The drill ground is only occasionally available and does not meet the fire department's day to day drill needs.

The most feasible solution to the problem is to provide an area adjacent to the station for such purposes. These areas should range in size from 3,000 - 5,000 square feet and be paved. At some station locations the high cost of property prohibits an adjacent drill area. In such cases it is suggested that drill areas be provided at a remote location where property values are not excessive and serve more than

one station. Visits to the drill area can be scheduled to avoid conflicts between stations; occasionally multi-company drills can be conducted. It is estimated that at least 5,000 square feet of paved area would be needed. This facility could be coordinated with a need for a community playground if use could be coordinated with fire department needs.

Recommendation No. 3 MANPOWER ASSIGNMENTS AND COSTS

The conclusion of this study is that the company manning should be improved in order to fully benefit from the total fire fighting potential of a company unit. It is therefore recommended that minimum engine company manning be not less than 5 men and that truck company manning be not less than 6 men. In addition a few engine companies (8 recommended) should be manned by not less than 6 men because of their strategic locations (See Table No. 10 in the Appendix Section).

It is further recommended that these minimum manpower assignments be rigidly observed. During vacation and heavy sickness periods where insufficient regular relief manpower is available, the mechanism for hiring off-duty personnel on an overtime basis should be established. To avoid excessive costs, vacations should be scheduled on a year around basis; use of sick leave should be policed, and regular relief personnel regularly adjusted.

Estimated personnel salary costs are $19,747,752, approximately $4,000,000 less than present budget (reduction of 240 men). Operating costs should reduce approximately $150,000 annually.

DETAILS OF FIRE DEPARTMENT ASSIGNMENTS AND COSTS

Personnel Assignments and Costs: (see Rec. No. 4 for Organization)

(Based on 52 hour week for fire fighting force).

Fire Commissioners	Est. Annual Cost	
3 - Commissioners	$ 3,600	
1 - Secretary	14,760	
4 Total		$18,300

Chief Officers	Est. Annual Cost	
1 - Fire Chief	$31,776	
1 - Deputy Fire Chief	26,736	
1 - Secretary	9,540	
7 - Operators	89,964	
1 - Physician	18,164	
3 - Chaplains		
14 Total		$176,180

Administration Division		
1 - Assistant Chief	$21,684	
1 - Battalion Chief	18,780	
1 - Finance Officer	14,400	
1 - Records Clerk	9,500	
1 - Clerical Supervisor	9,500	
*2 - Secretary - Steno.	19,080	
*2 - Filing Clerks	17,000	
*3 - Typist - Clerks	30,504	
12 Total		$140,448

Operations Division		
7 - Assistant Chiefs (2 Div.)	$151,788	
33 - Battalion Chiefs (8 Batt.)	619,740	
66 - Captains (49 Cos.)	1,033,560	
132 - Lieutenants	1,812,096	
1100 - Firemen	12,938,200	
40 - Operators	514,080	
6 - Pilots	93,960	
8 - Marine Engr.	125,280	
1392 Total		$17,288,704

*Assignments can be made to other divisions.

Fire Prevention Division	Est. Annual Cost	
1 - Assistant Chief	$ 21,684	
1 - Battalion Chief	18,780	
9 - Fire Captains	159,300	
42 - Fire Inspectors	593,712	
7 - Fire Investigators	98,952	
60 Total		$892,428

Operational Services Division		
1 - Assistant Chief	$ 21,684	
2 - Battalion Chiefs	37,560	
7 - Fire Captains	123,900	
2 - Fire Lieutenants	31,032	
2 - Firemen	24,000	
1 - Draftsman	10,000	
15 Total		$248,176

General Services Division		
1 - Assistant Chief	21,684	
1 - Battalion Chief	18,780	
2 - Fire Captains	35,400	
9 - Fire Lieutenants	139,644	
22 - Firemen	264,000	
1 - Water Superintendent	18,396	
1 - Hydrant Supervisor	19,683	
2 - Chief Engineers	27,300	
16 - Station Engineers	153,380	
1 - Sub-Foreman	18,342	
14 - Plumbers	235,791	
3 - Laborers	31,116	
73 Total		$983,516

Summary:	Est. Annual Cost
Fire Commissioners	$ 18,300
Chief Officers	176,180
Administration Div.	140,448
Operations Div.	17,288,704
Fire Prevention Div.	892,428
Operational Services Div.	248,176
General Services Div.	983,516
	$19,747,752
Total Number of Personnel	1,570

* Salary cost based on costs from 1969-70 approved budget.

Operating Costs:

With a reduction of 23 companies (engine, truck, hose, water tower), 17 fire stations, and a moderate reduction in personnel, the total operating and maintenance cost will be reduced. Based on the '69-70 budget this reduction is estimated as follows:

Maintenance of Automatic Equip. 25%($281,868)	= $70,467
Maintenance & Repair of Fire Stat. Equip.20%($96,500)	= 19,300
Telephone & Telegraph 10%($42,460)	= 4,246
Scavenger & Janitorial Services 15%($49,213)	= 7,382
Materials & Supplies 15%($84,451)	= 12,668
Replacement Equipment 15%$242,703)	= 36,405
Estimated Total Annual Reduction	$150,468

Summary

Present Personnel	Proposed Personnel	'69-70 Budget	Proposed Budget
1810	1570	$24,779,920	$20,488,557

Recommendation No. 4 ORGANIZATIONAL STRUCTURE

In order to effectively and efficiently administer and control the fire department operations and functions, the department should be reorganized. The present organizational structure has fairly well served the needs of the department but has become fragmented and in some respects inefficient. With implementation of the proposed changes, represented by other recommendations of this study, the present organization will be considerably inadequate and inefficient.

The recommended reorganizational plan provides the necessary degree of supervision and the manpower assignments to effectively carry out and maintain a progressive and functional fire department service. The total manpower needed to implement this plan is contained in Recommendation No. 3 and the details of the structure are contained in the following pages.

DETAILS OF ORGANIZATIONAL PLAN

The details of the recommended organizational plan can best be illustrated by structural and functional charts presented in Plates No. I through No. II on the following pages. These charts are designed to show the lines of authority and control, basic functions of each section and the number of personnel required.

The scope of this study did not include a thorough review and analysis of all fire department functions; such as fire prevention, training, maintenance, and water system. Therefore the manpower assignments for most sections, other than the Operation Division, should be considered as tentative until a specific examination of the manpower requirements can be made. It is expected that the actual requirements may vary slightly from the number recommended.

There are several aspects of the recommended plan which differ significantly from the present plan. The pertinent aspects of these differences are discussed in the following paragraphs.

Administration Division

The primary changes in this division will result in increased use of civilians and an improved supervision structure. It is the conclusion of this study that qualified civilians can better perform the finance, budget and clerical functions at a lower cost. The present arrangement of this division results in entirely too many people reporting directly to the Assistant Chief and some of the functions can be better performed and supervised by other Divisions. Many clerical, reproduction and record keeping functions of other divisions can be more efficiently performed by a central pool operation under the supervision of the Administration Division.

Fire Prevention Division

It is apparent from this study that fire prevention activities of the fire department should be increased. This should be accomplished by two methods; (1) establish a program of in-service company fire prevention inspections and (2) increase the size and activity of the Fire Prevention Bureau.

The details of a sound company fire prevention program are not included in this study, however there are many fire departments successfully conducting such programs and information from this source is available. The organizational structure and manpower recommended for expansion of the Bureau, again, is not the result of a detailed study. However, the magnitude of the problems and comparison with other fire departments support the recommended organization.

A successful and adequate fire prevention program for San Francisco will be important in reducing the number and magnitude of fires in the future. This in itself is a strong case for a stepped up fire prevention program in that future adjustments in fire department service may be justified by reduction in fire potential.

Training Section

The reorganization of the training section is designed to accomplish the following changes:

1. Reduce the work load on personnel in producing new training manuals.
2. Establish greater control and supervision of training performed at the company level.
3. Consolidate all department functions dealing with training and education under this division.

Research and Planning

The present staff performing these functions is totally inadequate. As a result many cost saving possibilities are by-passed simply because there is not enough time to devote to details. In addition, fire fighting operations are probably not benefiting by modern and improved equipment and techniques because of lack of personnel to pursue new ideas and concepts. It is considered essential to the maintenance of good planning and cost optimization to provide staff equivalent to that proposed by this recommendation.

Summary

Existing Organization	Personnel Assigned
Administrative staff	27
Fire fighting service	1654
Special auxiliary service	
Div. of Administration	37
Div. of Fire Prevention	39
Div. of Special Service	46
Div. of Training	7
	1810

Proposed organization	Personnel Assigned
Administrative Staff	18
Administrative Div.	12
Operations Div.	1392
Fire Prevention Div.	60
Operational Services Div.	15
General Services Div.	73
	1570

FIRE DEPARTMENT
DIVISIONAL ORGANIZATION CHART

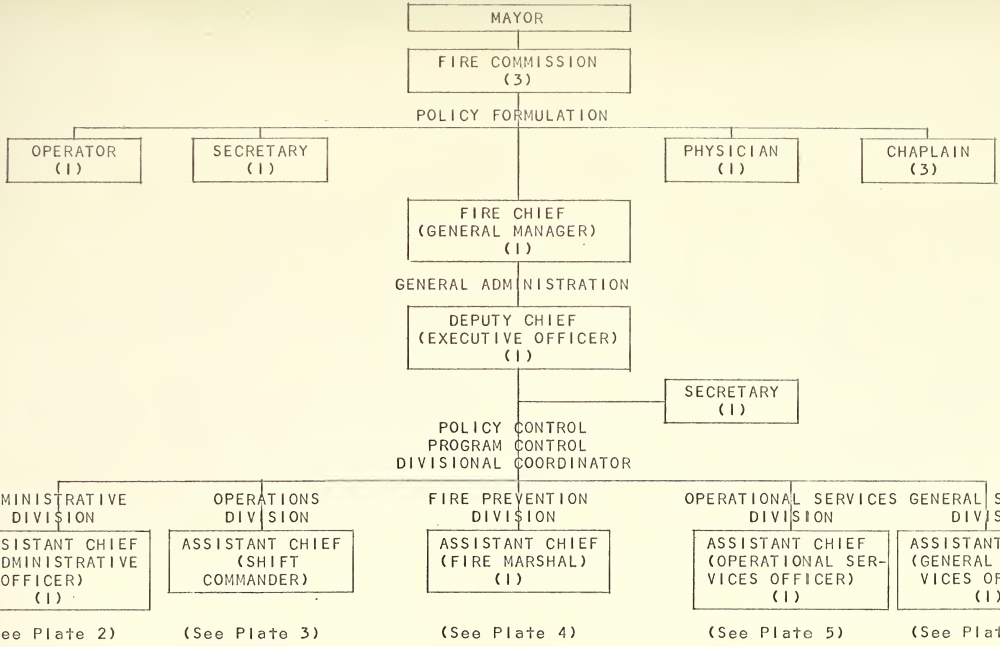


PLATE NO. 1

ADMINISTRATIVE DIVISION
FUNCTIONAL ORGANIZATIONAL CHART

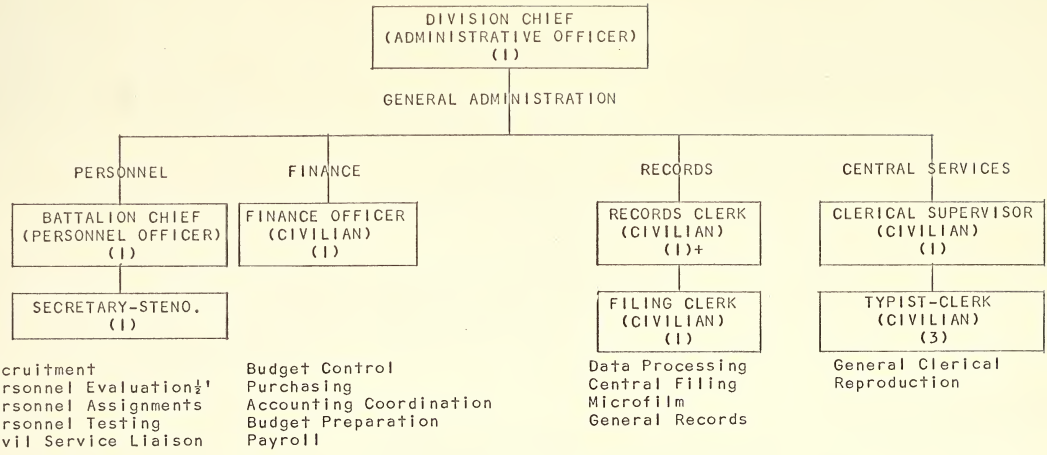
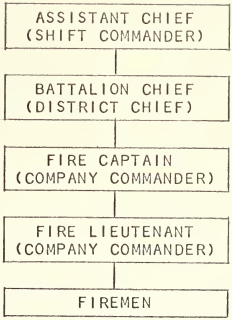


PLATE NO. 2

OPERATIONS DIVISION

FUNCTIONAL ORGANIZATIONAL CHART



Fire Fighting
First Aid
Rescue Service
Salvage Operations
Company Fire Prevention Inspections
Pre-fire Planning
Hydrant Inspection and Flow Testing
Area Fire Flow Testing

PLATE NO. 3

FIRE PREVENTION DIVISION
FUNCTIONAL ORGANIZATIONAL CHART

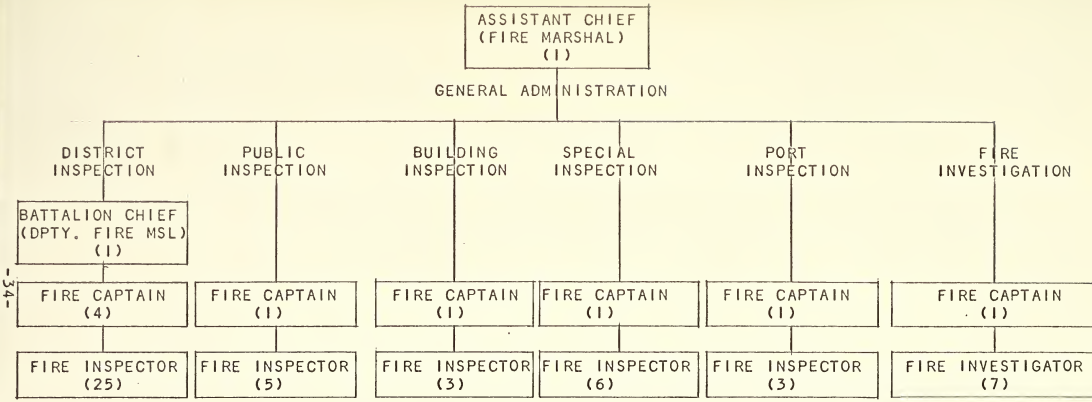


PLATE NO. 4

OPERATIONAL SERVICES DIVISION
FUNCTIONAL ORGANIZATION CHART

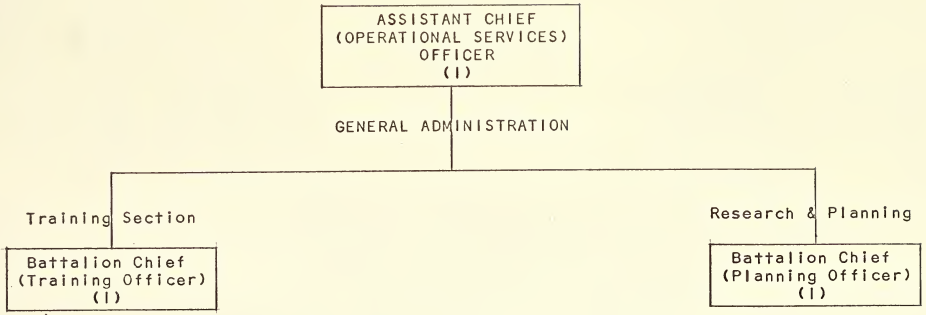


PLATE NO. 5

TRAINING SECTION

FUNCTIONAL ORGANIZATIONAL CHART

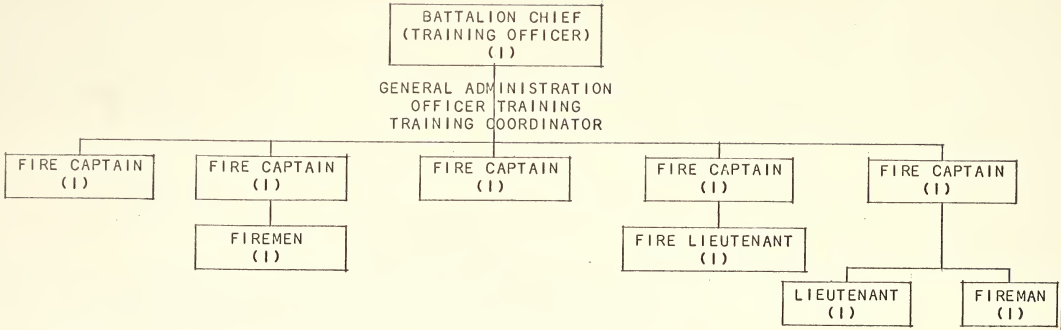
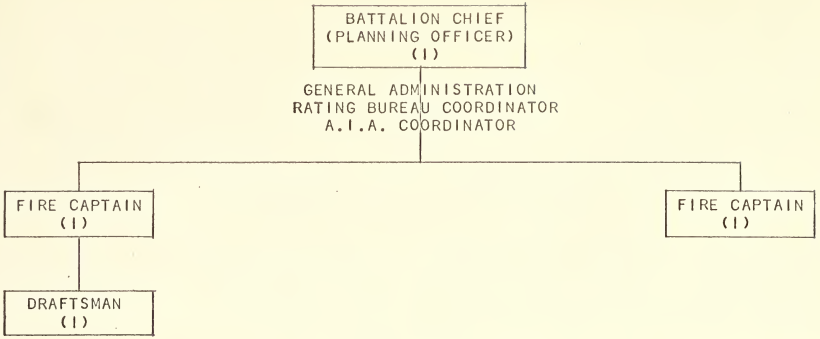


PLATE NO. 6

RESEARCH AND PLANNING SECTION
FUNCTIONAL ORGANIZATIONAL CHART



Departmental Systems Analysis
Fire Defense Analysis and Planning
General Planning
Company Dispatch Planning
Fire Defense Publications
Mapping

Fire Equipment Development
Fire Apparatus Development
Extinguishing Agent Development
Equipment Specifications

PLATE NO. 7

GENERAL SERVICES DIVISION

FUNCTIONAL ORGANIZATIONAL CHART

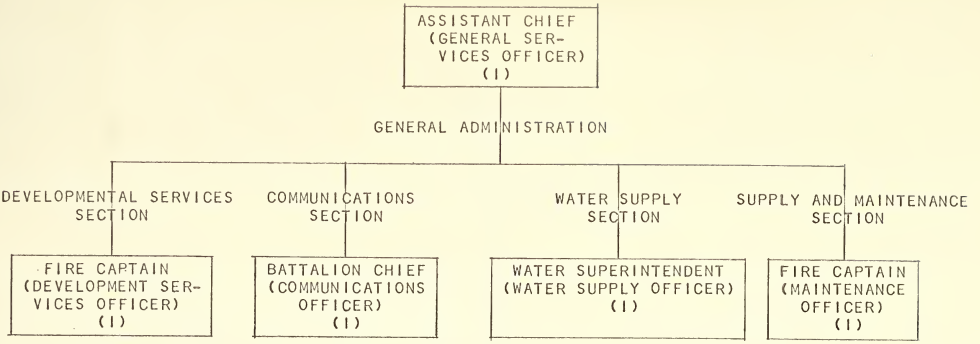
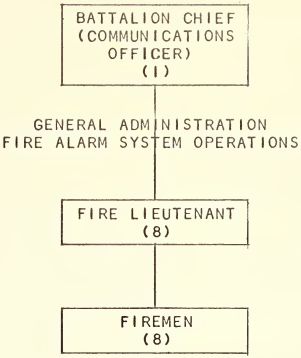


PLATE NO. 8

COMMUNICATIONS SECTION

FUNCTIONAL ORGANIZATIONAL CHART



Fire Alarm Receiving
Fire Equipment Dispatching
General Communications
Fire Alarm Records

PLATE NO. 9

WATER SUPPLY SECTION

FUNCTIONAL ORGANIZATIONAL CHART

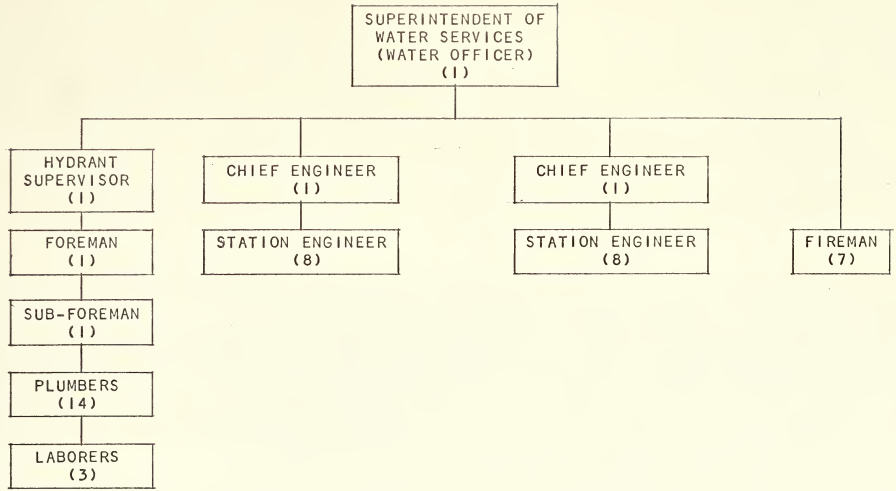
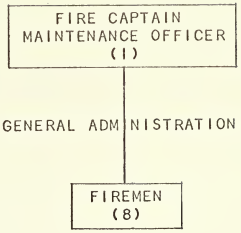


PLATE NO. 10

SUPPLY AND MAINTENANCE SECTION
FUNCTIONAL ORGANIZATIONAL CHART



Equipment Repair
Apparatus Repair
Emergency Maintenance

PLATE NO. 11

Recommendation No. 5 WORKING HOURS & MANPOWER UTILIZATION

The conclusions and recommendations of this study are that the 24-hour work shift should not be utilized for scheduling fire fighting personnel when the work week is less than 56 hours. A split shift arrangement of approximately 10 hours and 14 hours should be substituted. However, if company activity is heavy, causing inefficiency because of overwork the 8 hour shift (3 shifts per day) should be employed (300 fires per company per year is considered excessive).

It is suggested that the 42-hour, 8 day cycle with accumulated pay-back hours be employed for either the 42 or 40 hour week schedule if this work week is adopted in the future. The number of pay back hours can be adjusted to produce the desired total work week hours. The 42-hour, 12 day cycle schedule is suggested for the 48-hour week, if this work week should be adopted.

The split shift schedule is strongly urged to obtain reasonable efficiency and productivity. The 24-hour shift does not provide a reasonable return in productive hours and the men are subjected to excess work demands. Implementation of this recommendation will require amendments to the City Charter.

DETAILS OF WORK SHIFT ASSIGNMENTS

The hours per work week for firemen assigned to fire fighting duties has been declining sharply for the past several years. The 40 hour week is the recognized standard for the working man and firemen should expect nothing less than this standard. This standard is also on the decrease and a 35-hour week may well be the standard within the next few years.

The primary obstacle in reducing fire fighters' working hours is the cost in relation to the productivity. Productivity in large city departments is directly influenced by the length

of the work shift. The 24-hour shift limits the productivity per position, essentially to 8 to 9 hours. While productivity per position with 2 shifts per 24 hour period would vary from 12 to 14 hours.

With 3 shifts productivity could be as high as 24 hours (no sleeping periods). If firemen work a standard work week at an acceptable rate of pay, 40 hours of productive labor should be received; with less than a standard work week, less productivity can be tolerated since the cost will be less.

It can be logically argued that fire companies frequently are engaged in strenuous fire fighting activities involving danger to their life. Evaluation of the monetary value of fire fighting dangers is not undertaken in this study; however, it should be pointed out that injuries and fatalities to fire fighters frequently result from weariness. One of the best methods of relieving this condition is to reduce the length of the shift to a point where the men are not over taxed while on duty. Other methods, less drastic, can be employed, such as adjusting response assignments and switching companies, however, reduction of on-duty time is the most direct ultimate answer.

In the long run a standard work week with 2 or 3 shifts per 24 hour period will improve the status and professional standing of the firemen. Only by working full and productive shift assignments can the image of the fire fighter be improved.

Basic for all 2 or 3 shift systems (per 24 hours) is the 42 hour week with 4 platoons. From this basic system the hours per week can be easily adjusted to any desired level without a major change in the system. The system is of particular advantage to fire department administration because of its simplicity.

Schedule I presents the basic 42-hour week with an 8 day cycle utilizing 4 platoons.

Schedule I Recommended for a 40 - hour work week

42-hour, 4-platoon work week D=10-hour day shift N=14-hour night shift

Platoon Working	1	2	3	4	5	6	7	8
A	D	D			N	N		
B	N	N			D	D		
C			D	D			N	N
D			N	N			D	D

For a 40-hour work week the above schedule would be followed with 2 hours accumulated each week. Periodically a shift off would be scheduled and the position filled by relief firemen. This process can be followed in reducing hours below the 40-hour week by accumulating extra hours at a greater rate. At some point, however, it would be more practical to increase the days in the cycle and/or add another shift. The schedule for a 48-hour week can efficiently be handled by increasing the days in the cycle as presented in Schedule II below:

Schedule II Recommended for a 48 - hour work week.

42-hour, 4 Platoon Work Week

Platoon Working	1	2	3	4	5	6	7	8	9	10	11	12
A	D	D	D				N	N	N			
B	N	N	N				D	D	D			
C				D	D	D				N	N	N
D				N	N	N				D	D	D

The above system would be more efficient for a 48-hour schedule because of large number of hours accumulated each week (6 hours) and the excessive number of extra shifts required. The 12-day cycle presents improved management flexibility in assigning men to extra shifts.

Example: When the 4 shift, 42 hour schedule is used the 48 hour week would generate 322 hours (52 weeks X 6 hours), or approximately 26.8 shifts that must be additionally scheduled for each man. Therefore, a sub-numbering system will have to be superimposed whenever a day off occurs on each shift. The most practical method would be to assign a number of one through nine for each day off listed. Then assign personnel evenly divided by classification, to a number one through nine. Wherever the man's number appears he would be scheduled to work at an assigned company on a fill-in basis for another person who is absent for vacation, sickness, or injury. Whenever you determine the number of personnel needed to fill allocated company positions a certain number of non-strategic positions should be left unfilled to absorb the excess number of personnel available after the vacation, sickness and injury shortages have been filled. The sickness and injury factor should be determined by running a statistical analysis of the previous year's personnel record.

If a 42 or 40 hour week is in effect, the number system will not be needed, but additional relief personnel will be required to fill the normal absentee positions. Also, vacations should be spread evenly throughout the year if any semblance of constant manning is to be maintained.

Estimated Manpower Requirements for San Francisco

Present Total 52-hour week	Proposed Program 52-hour week	Estimated for 48-hour week	Estimated for 40-hour week
1810	1570	1680	1980

SUPPLEMENTARY INFORMATION

The recommended program of providing 2 or 3 shifts per day will provide an opportunity to establish and increase much needed programs because of the increase in productive hours. The present fire department work program is geared to a 24-hour shift where productive time is approximately 8 hours. This will be increased to 12 - 16 hours by the new system.

To accomodate this change it is urged that an in-depth study be made into establishing departmental performance goals and objectives for every task and activity performed or to be performed by the fire department.

Implementation of this suggestion should include a systematic methodology of defining department goals and objectives. The following outline will assist in establishing this program.

1. Establish department responsibilities.
2. Determine broad and specific department objectives.
3. Determine performance criteria.
4. Determine program objectives.
5. Determine tasks to be performed.
6. Determine task performance goals.
7. Establish organization to perform tasks.
8. Institute management controls.
9. Implement the program.
10. Evaluate programs.

The complete program suggested above should result in each person or unit being assigned goals and objectives and the authority and responsibility assigned for accomplishment. This process should then be controlled with an appropriate administrative structure. The structure proposed in Recommendation No. 4 should furnish the basic frame work to implement this phase.

It is desirable at this point to suggest a typical company work schedule in order to illustrate the preceding suggestion. Although the limited scope of this study does not permit a full appreciation of the present activities, it is possible to outline a typical program. Under these limitations the following typical schedule is outlined below.

Daytime 10 hour activities (listed by priority):

- Fire suppression and rescue (as assigned).
- Apparatus inspection and minor maintenance (daily).
- Equipment inspection and minor maintenance (daily).
- Communication system testing (daily).
- Company training (field - two hours daily).
- Pre-fire planning - inspect, record, and plan in detail the fire tactics to be used for each target occupancy within the company's first-in district (once a year each shift).
- Pre-fire plan and train on company fire tactics to be used in target occupancies within each company's first alarm assignment district (once a year each shift).
- Fire prevention code enforcement inspections (all company assigned occupancies, once a year).
- Water system testing (as assigned, two times a year required).
- Routine apparatus maintenance (daily).

Night time 14 hour activities (listed priority):

- Fire suppression and rescue (as assigned).
- General apparatus inspection and maintenance (daily)
- General equipment inspection and maintenance (daily)
- Communications system testing (daily)
- Company training (night field drill or classroom - 2 hrs. daily).
- Fire prevention code enforcement inspection (special occupancies as assigned.
- Company administration (records, etc. daily).
- Standby.

Recommendation No. 6 COMPANY FIRE RESPONSE ASSIGNMENTS

With the recommended improvement in the minimum on-duty manpower assigned to each company, (Recommendation No. 3 and Appendix Section), each company should have greater fire fighting potential. In addition further changes are needed to increase adequate overall fire fighting potential of each company in order to produce fire control capability with a fewer number of companies.

The study also indicates that a significant number of companies actually are not needed for fire control but are sent to the fire as a safety factor. Such companies can be available for response to other fires, if not fully committed to the first fire.

The response assignments appear to be excessive (also in excess of AIA standards). The following assignments are suggested in revising present run-cards.

First Alarm	------	3 Engines, 1 or 2 Trucks
Second Alarm	------	3 Engines, 2 Trucks
Third Alarm	------	3 Engines, 1 or 2 Trucks
Fourth Alarm	------	3 Engines, 1 Truck
Fifth Alarm	------	3 Engines, 1 Truck

Dispatching practices should be organized to incorporate responding companies into the full response pattern when they respond to vicinity boxes to the same fire. This may involve use of computer assistance to maintain control of the status of each company.

The assignment of Chief officers should be studied and revised to provide adequate but not excessive early command and control at all fires.

DETAILS OF CHANGES IN RESPONSE ASSIGNMENTS

Background

Current fire department practice is to assign the following number of companies to various alarms in important areas of the city:

First Alarm ------- 3 Engines, 1 or 2 Trucks
Second Alarm ------- 5 Engines, 1 or 2 Trucks
Third Alarm ------- 5 Engines, 1 or 2 Trucks
Fourth Alarm ------- 5 Engines, 1 Truck
Fifth Alarm ------- 5 Engines, 1 Truck

At a fifth alarm fire this would usually provide 23 Engines and an average of 6 truck companies. On occasion, more than this number are responding to the fire on special request by the chief officer and/or because of response to vicinity box alarms.

There have been a few occasions in the past where the companies remaining in service during a fifth alarm fire could be insufficient to control a large second fire should it occur simultaneously. This could be even more critical if the proposed plan of reducing the number of engines and truck companies is implemented without improving per company efficiency and improving company utilization.

Changes Proposed

The fire department practices in allocating response assignments to major fires should be reviewed in light of the changes proposed by this study. Although additional study is needed to determine specifically the changes to avoid a critical shortage of companies during a second fire situation, the following conclusions and recommendations are valid and should be of assistance in determining more specific action which should be taken in the future.

1. Greater fire fighting efficiency is available and obtainable from all companies. The primary restriction to this efficiency is assigned manpower. To this end the minimum manpower assignments have been considerably improved by Recommendation No. 3. However, improvement in greater application of engine company fire fighting potential is needed. Pump capacity is adequate if sufficient hose lines are utilized and suction

hose is of sufficient size. If fire methods are designed to make maximum use of apparatus and equipment, the number of companies actually used on a major fire can be significantly reduced.

2. The response of chief officers to fires should be carefully reviewed from the standpoint of need for command and control and delegation of responsibility. A Battalion Chief with an aide should respond with each first alarm assignment. An additional Chief Officer (Battalion Chief) should respond on first alarm assignment to high hazard or target occupancy. The basic reason is to establish early command and control on two sectors for those occupancies that have potential of becoming large multi-alarm fires. Also, an additional supervising Chief (Assistant Chief) with an aide should respond on large multi-alarm fires. The ratio of Battalion Chiefs to Assistant Chiefs at the fire should be about 3 to 1 or one for every group of 8 to 12 fire companies actively being used on the fire ground. Over response or supervision can easily deter motivation development and aggressive action on the part of subordinates.

3. Review of dispatching procedures should be made and a policy developed for companies responding to vicinity box alarms near a previous fire alarm. This response should be coordinated with the overall response assignment if only one fire is involved. Many times patterns established in the past originally were based on particular conditions which no longer exist or have been modified.

Recommendation No. 7 FIRE BOAT

It is the conclusion of this study that additional fire boat service is needed to maintain the level of fire protection to water front properties at the high level existing in San Francisco. In addition fire boat service to boats and ships in the harbor should be improved.

To accomplish these objectives it is recommended that a smaller faster boat be provided. This type of craft will not only be able to initiate fire control attack faster but will be considerably more maneuverable than the existing fire boat. The existing larger slower boat will be available for back-up should the fire progress beyond the point of control by the smaller boat. Estimated cost is approximately $350,000.

DETAILS OF FIRE BOAT NEEDS

There is approximately 6 miles of bay frontage composed of piers and wharfs. The nature of this area requires fire fighting services applied from the bay approach, in order to maintain adequate fire protection service. Water front structures are largely combustible construction such as wood pilings, decking and building. Few buildings have automatic sprinkler protection. In addition there are many large ships and pleasure boats in the harbor requiring fire boat service.

At the present time the San Francisco Fire Department maintains one fire boat in service; located at Station No. 9. The pumping capacity of this fire boat is approximately 9,000 gpm. Mutual aid is available on call from two Navy fire boats and the Oakland fire boat.

The Fire Department has urged for several years that an additional fire boat is badly needed. The American Insurance Association has recommended a fire boat in several of its past

gradings of San Francisco. It is the conclusion of this study that additional fire boat service is needed and should be provided.

The primary problem is to provide the type of fire boat which will best serve the many fire protection needs of the harbor and changing water front area. The increase in pleasure boats and marina occupancy has been significant. Present proposals for rebuilding the water front area to a substantially different occupancy is a probability which could significantly reduce the fire loss potential. Considering all of the factors it is recommended that a smaller faster fire boat with less pumping capacity be provided to supplement the slower fire boat with greater water stream power which is now in service. This combination will provide for faster response without sacrificing the heavier water strem capacity. The smaller boat will also be suitable for response to fires on the small pleasure boats. The criteria outlined below is recommended for use in providing an additional fire boat.

Length	40' - 45'
Propulsion	Diesel, twin screw
Propeller	Variable pitch
Max. speed	Approx. 20 knots
Light Water	100 gallons
Monitors	2 (bridge control)
Other Features	Radio, Fathometers, Radar

In addition, there are several desirable features which should be considered if found to be compatible with the boat design.

1. Use of jets for maneuvering.
2. Elevating platform tower and/or monitor equipment

Estimated cost (fully equipped) $350,000.

Recommendation No. 8 PROMOTION AND RETIREMENT

Promotional examinations should be based on oral interviews as well as written examination. The fire department administration should have the selection of any man of the top three on the eligibility list. Implementation will require a charter amendment.

Annual medical examinations should be required of all fire department personnel over 55 years. Assignment to fire fighting duty should be based on an analysis of these examinations. No one over 60 years of age should be assigned to active fire fighting duty.

BASIS FOR RECOMMENDED CHANGES

Promotional Examinations

In the past, promotions in many large cities have been used as a source of influence peddling, graft and corruption. As a result of this experience many cities have established controls to prevent this type of activity from occuring. As the city grows and conditions change, the very controls designed to improve city government may produce undesirable side effects.

Although the above described situation may not apply to the City and County of San Francisco, the result will be much the same if the present practice continues of basing fire department promotions essentially on the best score obtained by written examinations. The end result has to be that the fire department administrators and supervisors will be academically competent but may lack the important qualities of administration, leadership, salesmanship, and organization awareness. It is urged by this recommendation that this probability be avoided by adopting the usually accepted civil service program for promotion of fire department personnel.

Basically a sound promotional program will include elements of the following:

1. Approximately 50% of the final score is based on written examination.

2. Approximately 50% of the final score is based on oral interview by unbiased competent members of an interview board.

3. The fire chief has the selection of any of the top three men on the eligibility list composed of applicants in descending order of their scores.

Only by adopting this or a similar system can the City be assured of having the most competent men selected for promotion. Also this system provides some flexibility of assigning particular men to particular jobs, where special qualification and training may be of value. An effective organization structure depends on the personnel assigned to the tasks to be performed. Without some flexibility in assigning personnel there will be many instances where poor assignments will be made.

Medical Examinations:

Ordinance No. 222-68 provides for medical examinations for fire department personnel. This ordinance adequately establishes the frequency of examinations; however, it is only voluntary for personnel hired prior to the operating date (1968). For lack of funds the ordinance has not been implemented and actually is mandatory for only a small percentage of the total personnel.

Maintaining active experienced fire personnel in the department after the normal retirement age of 65 can be an asset to the department. On the other hand personnel allowed to continue on active duty when in poor health or physically incapable of

full performance after their retirement age can serve as a handicap to performance and effectiveness.

Many times firemen will remain on the job longer than they should because of interest in the work and the higher pay of active duty versus retirement status. Therefore it is urged that retirements beyond age 65 be based on continued good health and physical condition (as determined by a mandatory medical examination) and that assignments of personnel beyond age 55 be based on physical condition (as determined by a mandatory medical examination). In this way active physically capable firemen can be utilized to their fullest and firemen who should be retired for medical reasons will not be a detriment to the department.

Recommendation No. 9 FUTURE IMPROVEMENTS

The scope of this study has been limited to an examination and evaluation of the factors involved in personnel utilization. Essentially primary factors considered were companies needed, fire station locations, fire department organizational structure, and manpower assignments under various working hours. During the course of the field survey it was clear that other segments of the fire department operation could be improved and possibly costs reduced. It is therefore recommended that further study be given to the following fire department functions to improve efficiency and reduce costs.

FIRE ALARM SYSTEM AND FIRE DISPATCHING

For many years San Francisco has benefited from an extensive fire alarm street box system covering the entire city. The system has been maintained and expanded as conditions changed. The cost of this service has been high and the annual cost of maintenance and expansion has been considerable. In modern times the value of this service in some sections of the City has been questionable; where telephones are prevalent and the false alarm record has been high. It is not unusual to find that less than a third of the fire alarms are reported by the street box system and two thirds of those alarms are false. These circumstances have caused many large cities to reexamine the need for this service in various sections of the city. To date several cities have embarked on a program of removing street boxes and circuits from selected areas.

With the advent of the computer age, it was inevitable that computer capabilities would eventually find application in reducing municipal problems. Already a large number of cities are successfully utilizing computers for data processing. Only recently, however, have computers been utilized in public

safety operations. It is becoming more and more apparent that on-line computers can rapidly and accurately provide information which took days to report in the past. Application of this capability to fire department operations should produce significant improvement in fire department efficiency. The two primary functions where efficiency would be improved are in the dispatching of the nearest companies where their location is variable and in maintaining accurate and current information on the status of each company, car or special equipment. Other possibilities of improved efficiency can occur in the maintenance of records of fires, operations, and fire prevention.

HIGH PRESSURE WATER SYSTEM

Since 1913 a separate high pressure water system, exclusively for fire protection, has been in service in San Francisco. The system has been well maintained and expanded under the responsibility of the fire department. Reliability of system opeations and performance is kept at a high level.

Operation of the water supply works is essentially as it existed when built. Two steam pump plants are in service with a pump station crew on duty at all times. Two gate houses are manned continually. Approximately 24 men are needed to provide constant attendance to the facilities and keep them constantly in readiness.

By using more modern control systems and pumping equipment it appears logical to suspect that the costly manpower needed to man these facilities can be sharply reduced. Private industry for many years has provided unmanned fire pump service which is the sole protection of multi-million dollar industrial complexes. These systems are considered so reliable that insurance underwriters apply the very lowest insurance rates. A detailed examination of the application of these established

and reliable methods to the water supply problem in San Francisco's high pressure system is likely to result in substantial reductions without a reduction in the level of service provided.

FIRE PREVENTION PROGRAM

The present enforcement program consists essentially of 27 field inspectors and supervisory personnel. The program is limited to new construction and major problems because of this small force available.

The impact of a good fire prevention program in San Francisco can affect a variety of factors which contribute to the overall fire problem. These factors are numerated as follows:

1. Reduction in fire frequency - thus providing additional time for firemen to perform non-fire duties.

2. Reduction in fire severity - thereby reducing the need for heavy company responses to fires.

3. Reduction in the individual uninsured fire losses to public, business and industry.

4. Provides a greater public service and thus better public relations.

A closer examination of the fire department's fire prevention program and evaluation of practical and economical methods of improving this program are needed in order to develop a comprehensive program.

TRAINING PROGRAM

The fire department training program is not designed to provide a good level of training to all segments of the fire department organization. A cursory examination of the department organization revealed the following deficiencies:

1. No well planned and adequate daily drill program at the company level.

2. No formal program for officer training.

3. Little supervision of company drill programs.

4. Inadequate training facilities.

Modern technology is introducing unusual and deadly fire hazards at an increasing rate. The modern fireman has little time available to learn of new hazards and fire fighting techniques. In addition, fire department officers should be trained in modern personnel management practices in order to function more efficiently. The fire department's training program does not appear to be geared to this type of program. A close examination of the program now established and a study of alternative methods of improving the program is needed to develop a comprehensive improvement program.

DETAILS AND IMPORTANT DATA

FIRE DEPARTMENT

Organization

The fire department is directly supervised by Fire Chief William F. Murray, who is under the general supervision of the Fire Commission, appointed by Mayor Joseph L. Alioto. Presently serving on the Fire Commission are:

Morris Bernstein	President
Rudy Thaw	Vice-President
Frank N. Alioto	Commissioner
Faymond G. Connors Jr.	Secretary

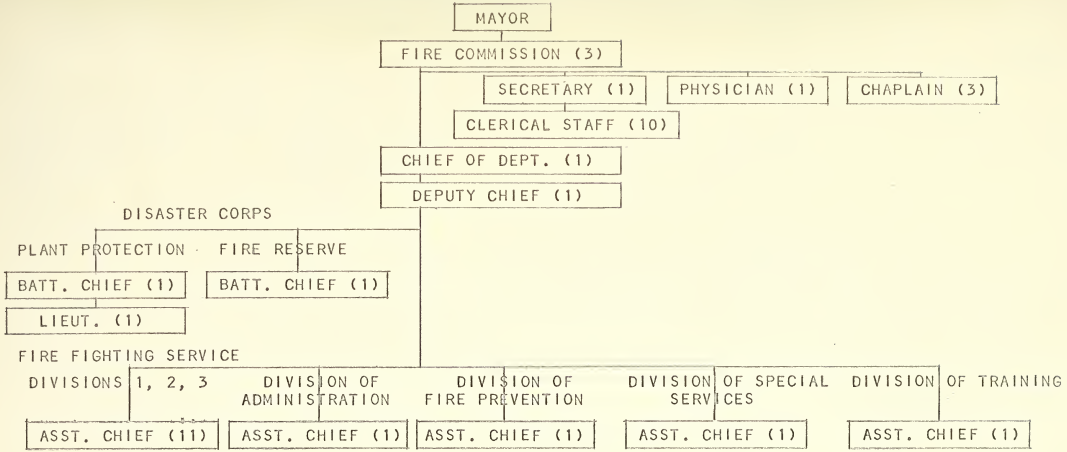
Assisting Chief Murray is a staff consisting of a Deputy Chief and 13 Assistant Chiefs. Department functions are divided into two sections; Fire Fighting Service and Special Auxiliary Service. The Fire Fighting Service is divided into three divisions with several battalions per division. Several stations and companies comprise each battalion. The Special Auxiliary Service is divided into four divisions as follows:

Division of Administration
Division of Fire Prevention
Division of Special Services
Division of Training

Further details of the organizational structure together with a functional description are illustrated on Plates 12 through 17.

FIRE DEPARTMENT

FUNCTIONAL ORGANIZATIONAL CHART



FUNCTIONS

Policy Control
Personnel Management
Program Control
Command of Fire Fighting Operations

Summary:		
	Fire Commissioners	3
	Commission Secretary & Staff	1 10
	Chief of Dept.	1
	Deputy Chief	1
	Asst. Chief.	15
	Battalion Chief	2
	Lieutenants	1

PLATE NO. 12

DIVISION NO. 1

ASST. CHIEF (3)

BA. #1 BA. #2 BA. #3

BC (3) BC (3) BC (3)

ENGINE COMPANIES	- 13
TRUCK COMPANIES	- 5
HOSE TENDERS	- 3
SALVAGE	- 2
RESCUE	- 1
FIRE BOAT	- 1
VALVE UNIT	- 1
WATER TOWER	- 4
S. L.	- 2
FUEL UNIT	- 1
HI. X FOAM UNIT	- 2
AIR COMPRESSOR	- 1
TOTAL MANPOWER:	
CAPT.	- 22
LIEUT.	- 48
FIREMEN	-368

FUNCTIONS

Fire Fighting
First Aid & Rescue Serv.
Salvage Operations
Sta. & Appara. Maint.
Training

DIVISION NO. 2

ASST. CHIEF (3)

BA. #4 BA. #5 BA. #8 BA. #9

BC (3) BC (3) BC (3) BC (3)

ENGINE COMPANIES	- 16
TRUCK COMPANIES	- 9
HOSE TENDERS	- 2
SALVAGE	- 1
RESCUE	- 1
SERVICE UNIT	- 2
TOTAL MANPOWER:	
CAPT.	- 27
LIEUT.	- 62
FIREMEN	- 428

RELIEF

Asst. Chf.	- 1
Batt. Chf.	- 6
Capt.	- 7
Lieut.	- 40
Oper.	- 3
Firemen	- 47

SWING TOUR ASSIGNMENTS

Asst. Chf.	- 1
Batt. Chf.	- 3
Lieut.	- 19
Oper.	- 3
Firemen	- 19

DIVISION NO. 3

ASST. CHIEF (3)

BA. #6 BA. #9 BA. #10 BA. #11 AIRPORT

BC (3) BC (3) BC (3) BC (3)

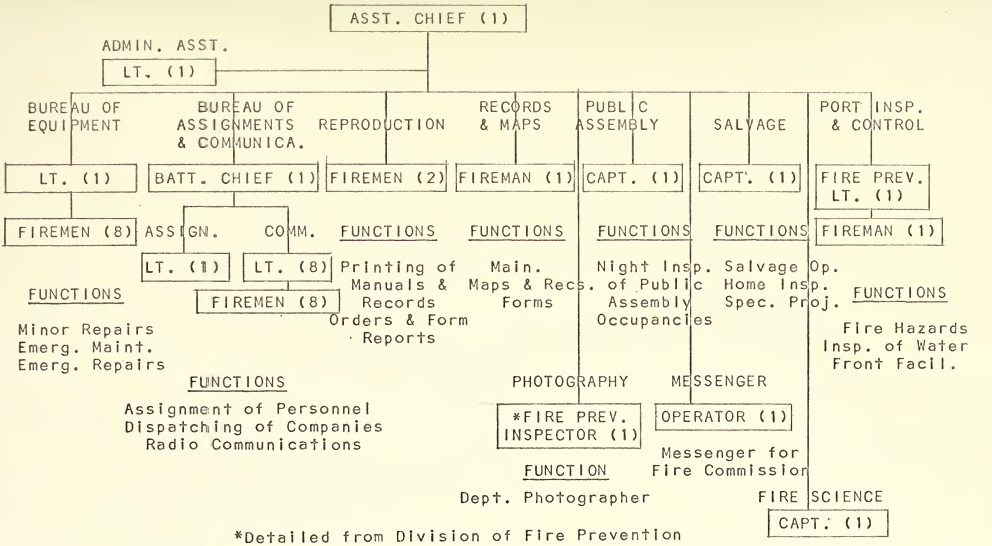
ENGINE COMPANIES	- 18
TRUCK COMPANIES	- 6
HOSE TENDERS	- 2
SALVAGE	- 1
FOAM UNIT	- 1
AIRPORT RESCUE	- 2
TOTAL MANPOWER:	
CAPT.	- 26
LIEUT.	- 63
FIREMEN	-406

Summary:

Asst. Chief	11
Batt. Chief	42
Capt.	82
Lieut.	213
Operators	50
Firemen	1249
Pilots	3
Marine Engr.	4

SPECIAL AUXILIARY SERVICE

DIVISION OF ADMINISTRATION



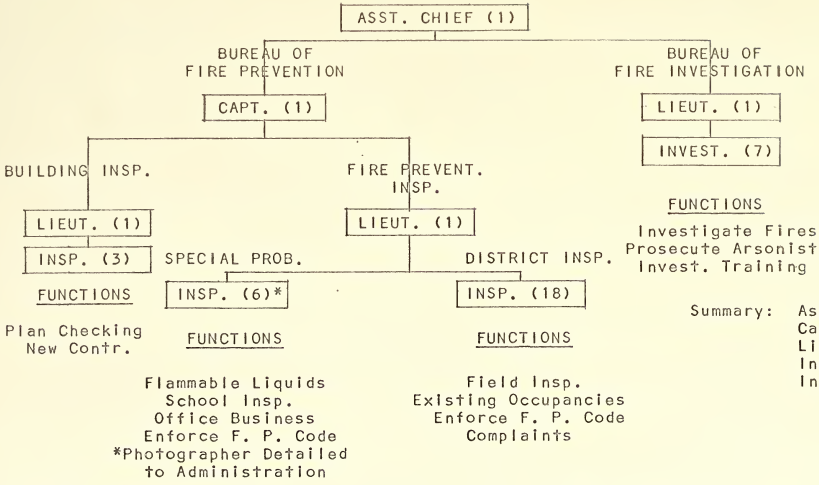
*Detailed from Division of Fire Prevention

Summary:		
	Asst. Chief	1
	Batt. Chief	1
	Capt.	3
	Lieut.	10
	Operator	1
	Firemen	19
	Fire Prev. Lieut.	1
	Fire Prev. Inspector	1

PLATE NO. 14

SPECIAL AUXILIARY SERVICE

DIVISION OF FIRE PREVENTION



Summary:

Asst. Chief	1
Capt.	1
Lieut.	3
Inspector	27
Investigator	7

PLATE NO. 15

SPECIAL AUXILIARY SERVICE

DIVISION OF SPECIAL SERVICE

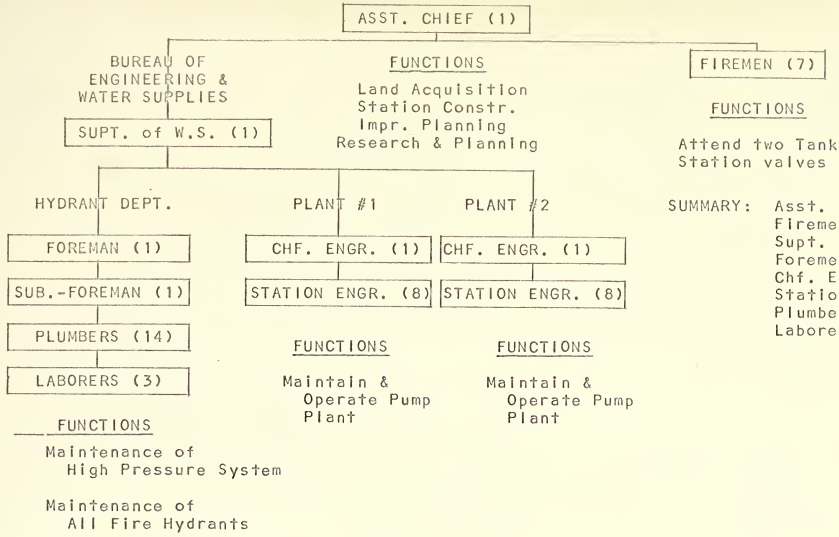
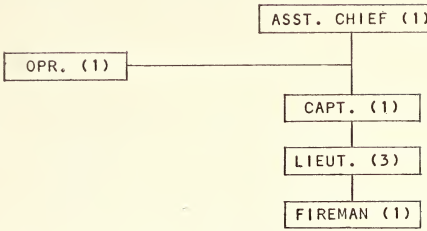


PLATE NO. 16

SPECIAL AUXILIARY SERVICE

DIVISION OF TRAINING



FUNCTIONS

Plan Daily Training Program

Recruit Training

Develop Training Manuals

Conduct Drill Ground Evolutions

Equipment Research

Demonstrations

Summary:		
	Asst. Chief	1
	Capt.	1
	Lieut.	3
	Operator	1
	Fireman	1

PLATE NO. 17

Personnel Assignments

Authorized Fire Department Personnel

CHIEF OFFICERS		
Fire Chief	1	
Deputy Chief	1	
Assistant Chiefs	15	
Battalion Chiefs	45	
		62
FIRE FIGHTING SERVICE		
Captains	82	
Lieutenants	213	
Operators	50	
Firemen	1249	
Pilot	3	
Marine Engineer	4	
		1601
SPECIAL AUXILIARY SERVICES		
Captains	5	
Lieutenants	18	
Operators	8	
Firemen	28	
Inspectors	27	
Investigators	7	
		93
NON-UNIFORM SERVICE		
Fire Commissioners	3	
Commission Secretary	1	
Accountants	2	
Secretary - Clerical	9	
Physician	1	
Water Supply Super.	1	
Pumping Station Personnel	18	
Hydrant Department	19	
		54
	Grand Total	1810

TABLE NO. 1

PERSONNEL AGE & TENURE TABLE

YRS. OF SERV.	NO.	YRS. OF SERV.	NO.	YRS. OF SERV.	NO.
1	93	25	7	49	4
2	67	26	49	50	1
3	104	27	87		
4	23	28	27		
5	57	29	2		
6	44	30	10		
7	54	31	36		
8	16	32	16		
9	12	33	15		
10	17	34	7		
11	22	35	11		
12	29	36	3		
13	41	37	10		
14	45	38	8		
15	120	39	1		
16	8	40	2		
17	13	41	9		
18	87	42	5		
19	43	43	2		
20	85	44	1		
21	84	45	2		
22	187	46	3		
23	28	47	4		
24	26	48	1		

TABLE NO. 2

PERSONNEL AGE & TENURE TABLE

AGE	NO.	AGE	NO.	AGE	NO.
21		45	84	69	3
22		46	73	70	4
23	1	47	56	71	6
24	17	48	68	72	4
25	19	49	62	73	3
26	35	50	39	74	1
27	36	51	64	75	2
28	29	52	62	76	1
29	35	53	54		
30	44	54	33		
31	42	55	35		
32	22	56	55		
33	30	57	51		
34	31	58	39		
35	24	59	22		
36	20	60	25		
37	47	61	22		
38	43	62	8		
39	44	63	12		
40	51	64	8		
41	39	65	8		
42	54	66	3		
43	61	67	6		
44	77	68	4		

TABLE NO. 3

COMPANY MANNING

July 1968 through June 1969

COMPANY		MANNING			DEPARTMENT
Type	Number	Average	Minimum	Maximum	ABSOLUTE MINIMUM
Engine	1	4.77	4	6	4
Engine	2	5.04	4	6	4
Engine	3	4.89	4	6	4
Engine	4	4.64	4	6	4
Engine	5	4.81	4	6	4
Engine	6	4.83	4	6	4
Engine	7	4.37	4	6	4
Engine	8	4.66	4	6	4
Engine	9	4.50	4	5	4
Engine	10	4.85	4	7	4
Engine	11	5.16	4	7	4
Engine	13	4.97	4	6	4
Engine	14	4.83	4	6	4
Engine	15	4.83	4	6	4
Engine	16	4.14	4	5	4
Engine	17	4.81	4	6	4
Engine	18	4.27	4	5	4
Engine	19	4.12	4	5	4
Engine	20	4.29	4	5	4
Engine	21	5.10	4	6	4
Engine	22	4.27	4	5	4
Engine	23	4.25	4	5	4
Engine	24	4.18	3	5	4
Engine	25	4.68	4	6	4
Engine	26	4.58	4	5	4
Engine	27	4.83	4	6	4
Engine	28	4.64	3	6	4
Engine	29	4.68	4	5	4
Engine	30	4.16	4	5	4

COMPANY MANNING TABLE pg. 2
July 1968 through June 1969

COMPANY		MANNING			DEPARTMENT
Type	Number	Average	Minimum	Maximum	ABSOLUTE MINIMU
Engine	32	4.22	4	5	4
Engine	33	4.27	4	5	4
Engine	34	5.12	4	6	4
Engine	35	4.54	3	6	4
Engine	36	4.25	3	5	4
Engine	37	4.20	4	5	4
Engine	38	4.52	4	5	4
Engine	39	4.14	4	5	4
Engine	40	4.56	4	5	4
Engine	41	4.77	4	5	4
Engine	42	4.77	4	7	4
Engine	43	4.22	4	5	4
Engine	44	4.20	4	5	4
Engine	45	4.35	4	5	4
Engine	46	4.52	4	5	4
Engine	47	4.29	4	5	4
Engine	48	4.35	4	5	4
Engine	49	4.45	4	5	4
Truck	1	6.41	6	7	6
Truck	2	6.10	5	7	6
Truck	3	6.16	6	7	6
Truck	4	6.14	6	7	6
Truck	5	6.35	5	7	6
Truck	6	6.25	6	7	6
Truck	7	6.25	6	7	6
Truck	8	6.14	6	7	6
Truck	9	6.14	6	7	6
Truck	10	6.14	6	7	6
Truck	11	6.25	6	7	6
Truck	12	6.06	6	7	6
Truck	13	6.04	5	7	6
Truck	14	6.06	6	7	6

COMPANY MANNING TABLE pg. 3
July 1968 through June 1969

COMPANY		MANNING			DEPARTMENT
Type	Number	Average	Minimum	Maximum	ABSOLUTE MINI
Truck	15	6.25	6	7	6
Truck	16	6.06	6	7	6
Truck	17	6.41	6	7	6
Truck	18	6.06	4	7	6
Truck	19	6.06	4	7	6
Truck	20	6.14	6	7	6
Hose Tender	1	1	1	1	1
Hose Tender	4	1	1	1	1
Hose Tender	6	1	1	1	1
Salvage Corps	1	3.97	3	5	4
Salvage Corps	2	4.87	4	6	4
Salvage Corps	3	4.00	3	5	4
Salvage Corps	4	4.04	3	5	4
Rescue Squad	1	4.93	4	5	5
Rescue Squad	2	5	5	5	5
Service Squad	1	1	1	1	1
Light Unit	1	1	1	1	1
Air Compressor	1	1	1	1	1
Water Tower	1	1	1	1	1
Fire Boat	1	4.95	4	5	5
Airport	1 & 2	14.22	12	15	15

Fire Department Budget Costs

The present budget estimate (1969-70) is as follows:

Personnel Services	$ 23,888,647
Contractual Services	513,258
Local Fares - Airport	500
Materials and Supplies	84,451
Equipment	285,000
Fixed Charges	3,820
Meritorious Awards	4,244
Total	$ 24,779,920

Past budget expenditures are shown in Plate No. 18.

Administration

The Fire Chief is the administrative head of the fire department, assisted by a staff as shown in Plate No. 12. It is the primary duty of the Chief to establish department policies and practices, appoint employees, make assignments as needed, recommend changes and additions to department facilities and equipment, and act as commander of all fire operations where considered necessary.

The primary duties of other fire department officers is to carry out the directives and orders of the Chief and generally supervise the daily operations of the department. A complete set of "Rules - Regulations, and Procedure Guide" has been adopted and enforced to govern the routine activities of officers and men.

Enlistment and Promotion

All fire department personnel, except the Chief and Deputy Chief are under City Civil Service Regulation. New enlistments are given a written and oral examination. The promotional exam consists of a written examination. Both enlistments and promotions are selected from the top of the eligibility list.

FIRE DEPARTMENT BUDGET 1964 - 1969

Plate No. 18

Fire fighting personnel (essentially) are on a 52-hour work week schedule. The day to day schedule is arranged on a 24-hour shift basis with 8 shifts worked per each 26 day period. Table No. 3 presents the variations in the actual on-duty manpower per each company over the last 12 months.

Fire Stations

The city is served by 47 fire stations (not including 2 airport fire stations). Fire department administrative headquarters are located at 260 Golden Gate Avenue. Drawing No. 7004-2 (back of report) shows the location of the present fire stations and the one mile response distances from these stations. Table Nos. 4 and 5 present pertinent data on station location, design, age, facilities, etc.

In general, fire stations are in good condition and have provided the important facilities needed. There are some stations which are 50 years old or over and facilities are in need of improvement and modernizing.

A list of Fire Stations and facilities is presented in Tables No. 4 and 5. As shown on this list, there are 47 Fire Stations in service, all constructed since 1897. Fifteen stations, comprising 31% of the total, were constructed prior to 1920. However, only one was constructed prior to 1900.

Companies

Company locations (and fire stations) are dictated by distance limitations needed to minimize response time after the alarm is received. Basically, the larger the fire problem, the shorter the company travel distance should be. The relative magnitude of the fire problem is indicative of the necessary water flow needed for fire control. The required fire flows (or water flows) are indicated on Drawing No. 7004-1. A tabulation of pertinent data on apparatus in service is presented in Table No. 3.

The standards of the American Insurance Association are also keyed to the required fire flows. The following table indicates the maximum company response distances corresponding to the required fire flows.

TABLE NO. 4

FIRE STATION DATA - #1

Station Number	Address	Companies Housed	Year Constructed	Lot Area Sq. Ft.
1	115 Drum St.	Engine 1, Rescue 1 Hose Tender 1 Salvage 3, Truck 13 Division Chief 1	1957	8,963
2	460 Bush St.	Engine 2	1903	3,105
3	1067 Post St.	Engine 3, Truck 3	1916	3,660
4	676 Howard St.	Engine 4, Batt. Ch. 3	1958	4,400
5	1340 Powell St.	Engine 5, Truck 2 Batt. Ch. 1	1916 1955*	4,608
6	356 7th St.	Engine 6, Salvage 1	1912 1956*	4,250
7	80 Digby	Engine 7	1968	10,360
8	1648 Pacific Ave.	Engine 8, Truck 4	1917	3,830
9	Pier 22½	Engine 9, Fire Boat 1	1915	Pier Bulkhead
10	2300 Folsom	Engine 10, Truck 7 Division Chief 3 Hose Tender 6 Salvage 4	1954	9,025
11	1295 Shafter Ave.	Engine 11, Truck 17	1956	10,000
13	3880 26th St.	Engine 13, Truck 11 Batt. Chief 6	1958	11,628
14	109 Oak St.	Engine 14, Batt. Ch. 2	1961	6,600
15	2150 Calif. St.	Engine 15, Rescue 2 Salvage 2, Batt. Ch. 4	1960	11,515
16	909 Tennessee	Engine 16	1926	5,000
17	416 Jessie St.	Engine 17, Truck 1 Hose Tender 4	1969+	5,625
18	1298 Girard	Engine 18	1915	6,000

FIRE STATION TABLE #1 pg. 2

Station Number	Address	Companies Housed	Year Constructed	Lot Area Sq. Ft.
19	1300 4th St.	Engine 19 Air Compressor 1 Water Tower 1	1928	27,108
20	2251 Greenwich	Engine 20, Truck 16	1938 1956*	5,760
21	1443 Grove St.	Engine 21, Batt. Ch. 5	1958	8,164
22	1290 16th Ave.	Engine 22	1962	7,500
23	285 Olympia Way	Engine 23, Truck 20	1963	17,600
24	100 Hoffman St.	Engine 24	1914	5,550
25	3305 3rd St.	Engine 25	1927	13,110
26	655 Presidio Ave.	Engine 26, Truck 10	1956	30,883
27	135 Sanchez St.	Engine 27, Truck 6	1950	12,500
28	1814 Stockton St.	Engine 28	1967	2,782
29	299 Vermont St.	Engine 28, Fuel Unit	1955	5,950
30	390 Buckingham Way	Engine 30, Truck 19	1953	10,692
32	194 Park St.	Engine 32	1942	4,500
33	117 Broad St.	Engine 33	1897	3,125
34	1301 Turk St.	Engine 34, Truck 5 Division Chief 2	1955	13,750
35	36 Blusome St.	Engine 35, Truck 8 Hose Tender 4 Light Wagon 1	1940	6,000
36	551 26th Ave.	Engine 36, Truck 14	1905	3,600
37	2501 25th St.	Engine 37, Truck 9	1918	7,500
38	1000 Ocean Ave.	Engine 38, Truck 15 Batt. Chief 9	1957	15,316
39	1091 Portola Drive	Engine 39	1923 1955*	29,984

FIRE STATION TABLE #1 pg. 3

Station Number	Address	Companies Housed	Year Constructed	Lot Area Sq. Ft.
40	1145 Stanyan St.	Engine 40, Truck 12	1956	11,150
41	1325 Leavenworth St.	Engine 41	1957	2,956
42	2430 San Bruno Ave.	Engine 42, Batt. Ch. 10	1912	6,000
43	170 Moscow	Engine 43	1969+	10,000
44	1935 32nd Ave.	Engine 44, Truck 18	1951	15,000
45	1348 45th Ave.	Engine 45	1957	3,600
46	441 12th Ave.	Engine 46, Batt. Ch. 7	1913	12,240
47	499 41st Ave.	Engine 47	1928	5,410
48	798 Wisconsin St.	Engine 48, Batt. Ch. 11	1915	5,000
49	2155 18th	Engine 49, Batt. Ch. 8	1931	6,000

*indicates remodelling
+under construction

TABLE NO. 5

FIRE STATION DATA - #2

Station Number	Apparatus Bays	Dormitory Size	Ground Floor Area Sq. Ft.	Stories	General Condition
1	4	Adequate	8,541	2	Good
2	1	Adequate	2,500	2	Poor
3	2	Cramped	2,610	2	Poor
4	2	Adequate	4,400	2	Good
5	3	Cramped	4,146	2	Good
6	2	Adequate	4,067	2	Good
7	2	Cramped	5,620	2	Good
8	2	Cramped	2,392	2	Poor
9	1	Cramped	2,420	2	Poor
10	4	Adequate	8,373	2 & M	Good
11	3	Adequate	6,750	2	Good
13	3	Adequate	7,267	2	Good
14	3	Adequate	4,702	2	Good
15	3	Adequate	6,790	2	Good
16	2	Cramped	2,943	2	Poor
17	3	Adequate	5,625	2	Good
18	1	Adequate	2,125	2	Fair
19	2	Cramped	3,780	2	Poor
20	2	Cramped	2,585	2	Fair
21	2	Adequate	4,950	2	Good
22	2	Adequate	3,715	2	Good
23	3	Adequate	5,828	2	Good
24	1	Adequate	2,750	2	Fair
25	2	Adequate	3,976	2	Fair
26	3	Adequate	6,725	2	Good
27	3	Adequate	7,200	2	Good
28	2	Adequate	2,178	2	Good
29	2	Adequate	4,150	2	Good
30	3	Adequate	4,800	2	Good
32	2	Adequate	2,840	2	Fair
33	1	Adequate	2,727	2	Poor
34	3	Adequate	6,165	2	Good

FIRE STATION TABLE #2 pg. 2

Station Number	Apparatus Bays	Dormitory Size	Ground Floor Area Sq. Ft.	Stories	General Condition
35	3	Cramped	6,800	2	Fair
36	1	Cramped	3,060	2	Poor
37	2	Cramped	5,490	1	Poor
38	3	Adequate	6,075	2	Good
39	2	Adequate	4,860	2	Poor
40	3	Adequate	6,000	2	Good
41	1	Adequate	2,376	2	Good
42	1	Adequate	2,777	2	Poor
43	3	Adequate	1,875	2	Good
44	3	Adequate	8,200	2	Good
45	1	Adequate	2,250	2	Good
46	2	Cramped	4,000	2	Fair
47	2	Cramped	2,500	2	Fair
48	1	Adequate	2,700	2	Poor
49	2	Adequate	3,600	2	Good

TABLE NO. 6

FIRE DEPARTMENT VEHICLES

ENGINE COMPANIES

Eng. Co.	Make	Pumping Capacity, GPM	Year	Remarks
1	LaFrance Mack	1250 Hose Tender No. 1	1963 1950	
2	LaFrance	1250	1964	
3	LaFrance	1250	1967	
4	LaFrance Trailer	1250 Water Tower No. 1	1965 1902	
5	LaFrance	1250	1964	
6	LaFrance	1250	1966	
7	Seagrave	1000	1957	
8	LaFrance	1250	1966	
9	LaFrance	1000	1950	
10	LaFrance Mack	 Hose Tender No. 6	1959 1950	
11	Seagrave	1000	1957	
13	LaFrance	1000	1959	
14	LaFrance	1000	1960	
15	LaFrance	1000	1960	
16	Seagrave	1000	1953	
17	LaFrance Ford	1250 Hose Tender No. 4	1964 1967	
18	Seagrave	1000	1952	
19	LaFrance	1000	1955	
20	LaFrance	1000	1959	
21	LaFrance	1250	1963	
22	Seagrave	1000	1956	

Eng. Co.	Make	Pumping Capacity, GPM	Year	Remarks
23	Seagrave	1000	1950	
24	LaFrance	1000	1961	
25	Seagrave	1000	1957	
26	LaFrance	1000	1961	
27	LaFrance	1000	1959	
28	LaFrance	1250	1966	
29	LaFrance	1250	1967	
30	LaFrance	1000	1958	
32	Seagrave	1000	1957	
33	LaFrance	1000	1958	
34	LaFrance	1000	1962	
35	LaFrance	1250	1965	
36	LaFrance	1000	1958	
37	Seagrave	1000	1957	
38	LaFrance	1000	1959	
39	LaFrance	1000	1958	
40	LaFrance	1000	1959	
41	LaFrance	1000	1962	
42	Seagrave	1000	1956	
43	Seagrave	1000	1952	
44	LaFrance	1000	1958	
45	Seagrave	1000	1949	
46	LaFrance	1000	1960	
47	LaFrance	1000	1958	
48	LaFrance	1000	1962	
49	LaFrance	1000	1954	

LADDER COMPANIES

Lad. Co.	Make	Height, Aerial, Ft.	Year	Remarks
1	LaFrance Aerial	100'	1966 1966	(Tractor) (Trailer)
2	LaFrance Aerial	100'	1964 1964	(Tractor) (Trailer)
3	LaFrance Aerial	100'	1965 1965	(Tractor) (Trailer)
4	LaFrance Aerial	100'	1959 1959	(Tractor) (Trailer)
5	LaFrance Aerial	100'	1967 1967	(Tractor) (Trailer)
6	Seagrave Aerial	100'	1961 1961	(Tractor) (Trailer)
7	LaFrance Aerial	100'	1962 1962	(Tractor) (Trailer)
8	LaFrance Aerial	100'	-- 1960	(Tractor) (Trailer)
9	Seagrave Aerial	85'	1957 1946	(Tractor) (Trailer)
10	LaFrance Aerial	100'	1955 1950	(Tractor) (Trailer)
11	LaFrance Aerial	100'	1950 1950	(Tractor) (Trailer)
12	Seagrave Aerial	92'	1946 1944	(Tractor) (Trailer)
13	LaFrance Aerial	100'	1963 1963	(Tractor) (Trailer)
14	LaFrance Aerial	100'	1950 1955	(Tractor) (Trailer)
15	Seagrave Aerial	100'	1956 1956	(Tractor) (Trailer)
16	Seagrave Aerial	100'	1952 1952	(Tractor) (Trailer)
17	Seagrave City Serv.	--	1948 1924	(Tractor) (Trailer)

Lad. Co.	Make	Height, Aerial, Ft.	Year	Remarks
18	Seagrave Aerial	85'	1950 1939	(Tractor (Trailor
19	Seagrave Aerial	85'	1950 1939	(Tractor (Trailer
20	Seagrave City Serv.	--	1953 1926	(Tractor (Trailer

SPARE PUMPERS
(Relief or Reserve)

Make	Year	Remarks
Seagrave	1949	In Reserve
LaFrance	1953	In Reserve
LaFrance	1950	In Reserve
Seagrave	1943	In Reserve
LaFrance	1946	In Relief
LaFrance	1946	Loaded Pumper Relief Eng. 16
LaFrance	1946	Loaded Pumper Relief Eng. 14
LaFrance	1946	In Reserve
LaFrance	1946	Loaded Pumper Relief Eng. 46
Seagrave	1948	In Reserve
Seagrave	1948	Loaded Pumper Relief Eng. 38
Seagrave	1948	In Reserve
LaFrance	1948	In Reserve
LaFrance	1948	In Reserve
Seagrave	1949	In Reserve
Seagrave	1950	In Reserve

SPARE LADDER TRUCKS

Make	Year	Remarks
Kleiber (Tractor)	1928	In Reserve
Mack (Tractor)	1929	In Reserve
Mack (Tractor)	1929	In Reserve
Mack (Tractor)	1931	In Reserve
Seagrave (Tractor)	1932	In Reserve
Mack (Tractor)	1934	In Reserve
Mack (Tractor)	1937	In Reserve
Ahrens Fox (Tractor)	1939	Relief
Seagrave (Tractor)	1943	In Reserve
Seagrave (Tractor)	1943	In Reserve
Seagrave (Tractor)	1944	In Reserve
Ahrens Fox (Tractor)	1939	In Reserve
Mack (Tractor)	1929	In Reserve
Seagrave (Tractor)	1948	In Reserve
City Serv. (Trailer)	1914	In Reserve
City Serv. (Trailer)	1926	In Reserve
City Serv. (Trailer)	1928	In Reserve
City Serv. (Trailer)	1928	In Reserve
City Serv. (Trailer)	1929	In Reserve
City Serv. (Trailer)	1929	In Reserve

MISCELLANEOUS APPARATUS IN SERVICE

Salvage Co. No. 1	1948 LaFrance
Salvage Co. No. 2	1948 LaFrance
Salvage Co. No. 3	1950 Mack
Salvage Co. No. 4	1957 White

Rescue Sd. No. 1	1955 LaFrance	
Rescue Sd. No. 2	1956 Seagrave	
Searchlight No. 2	1952 GMC	
Tow Truck	1940 Kenworth	
Air Compressor	1951 White	
Coffee unit	1942 Chev.	
Foam unit	1936 LaFrance	
Service Squad No. 1	1963 GMC	
Service Squad	1967 Chev.	
Fuel unit	1951 GMC	
Radio Command Veh.	1967 GMC	
Delivery Truck	1965 Ford	
Passenger Bus	1957 Int.	
Valve unit	1961 Ford	
Delivery Truck	1938 Ford	(Sand Truck)
Delivery Truck	1942 Chev.	
Fireboat		

MISCELLANEOUS APPARATUS IN RESERVE OR RELIEF

Aux. Pumps -- assigned to Civil Defense (nineteen - 1952 - Chev. 500 g.p.m. each)		
Aux. Tr. Pumps assigned to Bureau Equipment (three - 1941 - Chrys. 500 g.p.m. each)		
Foam Pumps assigned to Bureau Equipment (two - 1941 - Chrys. 500 g.p.m. each)		
Hose Tenders		
H.T. No. 3 (Eng. 25)	1937 LaFrance	
H.T. No. 5 (Eng. 34)	1946 LaFrance	
H.T. No. 7 (Eng. 8)	1936 LaFrance	
H.T. No. 8 (Eng. 5)	1946 LaFrance	
H.T. (Airport)	1938 LaFrance	
H.T. (Relief)(E-40)	1940 Fabco	
H.T. (Relief)(E-23)	1938 Fageol	
H.T. (Relief)(E-41)	1941 Fabco	
Tank Unit	1937 Fageol	
Tank Unit	1946 LaFrance	

Salvage Unit	1946 LaFrance
Water Tower No. 2	1898 Trailer
Water Tower No. 3 (Eng. 29)	1927 Mack
Water Tower No. 4	1927 Mack
Rescue Squad	1942 Dodge
Rescue Squad	1930 Mack
Searchlight No. 1	1928 Kleiber

AUTOMOBILES

Total of 55	Automobiles, Chief's cars, etc.

MISCELLANEOUS

Total of 22	Service, Utility, and Valve Trucks
Total of 1	Compressor Trailer

INOPERATIVE

Training Pumper	1943 Seagrave
Tractor	1958 LaFrance

TABLE NO. 7

COMPANY RESPONSE DISTANCES

REQUIRED FIRE FLOWS FLOWS	MAXIMUM RESPONSE DISTANCES	
	Engine	Ladder
	HIGH VALUE AREAS	
0 to 4500 gpm	1½ miles	2 miles
4500 gpm to 9000 gpm	1 mile	1½ miles
over 9000 gpm	3/4 mile	1 mile
	RESIDENTIAL AREAS	
	2 miles	3 miles
	HIGH RISE RESIDENTIAL	
	1½ miles	2 miles

In addition to the location of "first-in" companies the concentration of companies is a significant factor for major fires. The American Insurance Association standards on concentration of companies (engine and ladder) for high value areas are presented in Plate Nos. 19 and 20.

Response of Companies

Response assignments are assigned to each fire alarm box location for 1st through 5th alarms. Generally this would provide a typical response as outlined below for engine and truck companies.

FIRST ALARM	3 Engines, 1 or 2 Trucks
SECOND ALARM	5 Engines, 1 or 2 Trucks
THIRD ALARM	5 Engines, 1 or 2 Trucks
FOURTH ALARM	5 Engines, 1 Truck
FIFTH ALARM	5 Engines, 1 Truck

The actual number of responses are tabulated for the last 5 years for each company in Table No. 8. Note that the number of responses included both fires and false alarms.

ENGINE COMPANY CONCENTRATION STANDARDS (AIA)

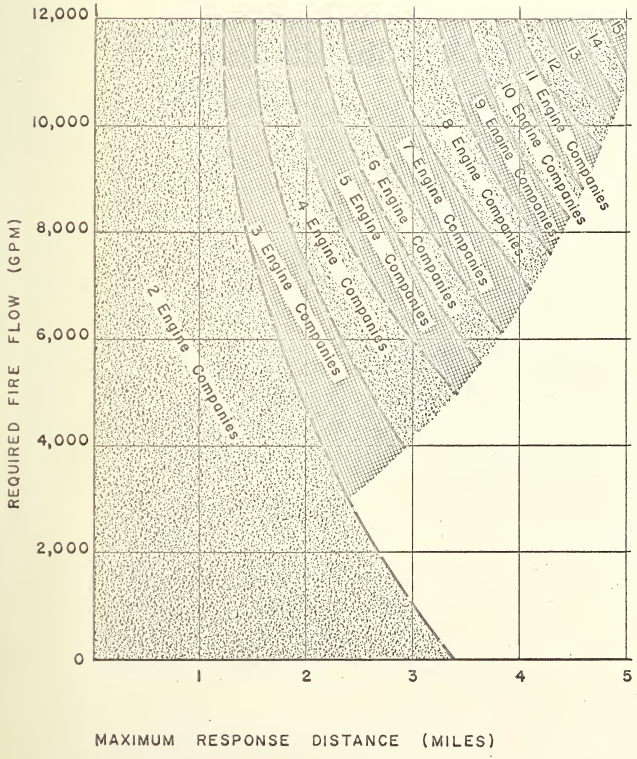


Plate No. 19

LADDER COMPANY CONCENTRATION STANDARDS (AIA)

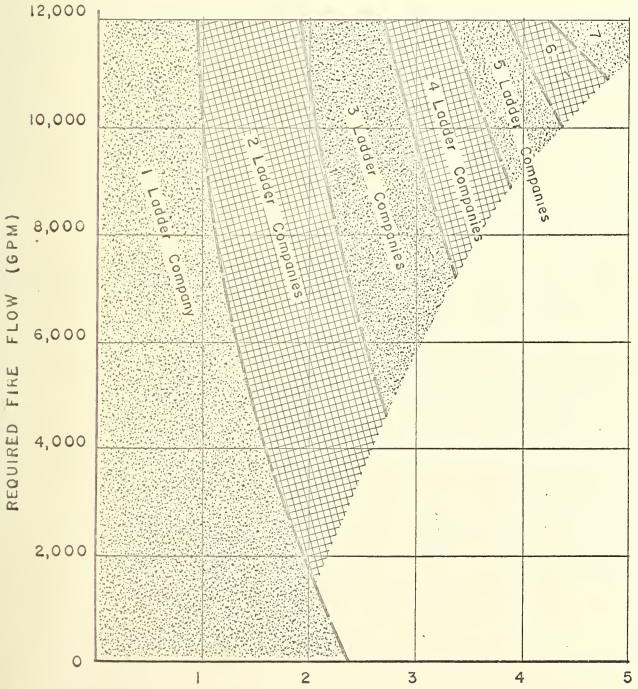


Plate No. 20

Response of companies to major fires is of concern since the number of companies committed to fire operations is an indication of the number of companies available should a simultaneious second fire occur. Table No. 9 presents the data for 4th and 5th alarm fires occurring since 1964 (to 7-1-69).

In addition a special study was conducted of 3 recent 5th alarm fires to determine specifically the status of each engine and truck company. This data is summarized as follows:

Fire at 1404-34 3rd Street, June 29, 1969	
Engine Companies at fire	35
Truck Companies at fire	9
Engine Companies available for response	12
Truck Companies available for response	11
Fire at 99 Bayshore Blvd., August 20, 1969	
Engine Companies at fire	24
Truck Companies at fire	8
Engine Companies available for response	23
Truck Companies available for response	12
Fire at Fulton and Masonic, September 11, 1969	
Engine Companies at fire	23
Truck Companies at fire	8
Engine Companies available for response	24
Truck Companies available for response	12

TABLE NO. 8

ENGINE COMPANY RESPONSES

Co. No.	1964	1965	1966	1967	1968
11	1460	1783	2324	2835	3124
21	1263	1437	1657	2043	2687
42	1384	1840	1497	2372	2615
34	1400	1394	1757	2026	2450
25	1109	1249	1607	1828	2077
38	1140	1303	1277	1479	1809
27	929	1033	1184	1472	1799
43	1044	1019	1245	1238	1773
13	1447	1441	1521	1644	1739
14	940	970	1156	1426	1735
26	924	1001	1129	1254	1658
32	1035	1078	1253	1393	1617
18	848	844	949	1504	1588
10	916	907	1066	1118	1546
37	997	965	1184	1322	1473
33	823	914	1006	1145	1470
48	721	775	965	1071	1319
3	886	918	1033	1191	1316
15	769	869	956	967	1197
17	858	797	951	977	1098
40	582	744	724	901	1097
2	736	782	910	987	1004
41	757	722	788	969	929
30	600	621	639	786	920
29	534	539	569	624	873
7	933	947	984	1154	852
4	578	661	682	669	830
16	736	530	614	620	806
24	546	563	643	673	791
5	585	629	719	924	752
22	591	577	586	690	751

TABLE NO. 8

ENGINE COMPANY RESPONSES

Co. No.	1964	1965	1966	1967	1968
11	1460	1783	2324	2835	3124
21	1263	1437	1657	2043	2687
42	1384	1840	1497	2372	2615
34	1400	1394	1757	2026	2450
25	1109	1249	1607	1828	2077
38	1140	1303	1277	1479	1809
27	929	1033	1184	1472	1799
43	1044	1019	1245	1238	1773
13	1447	1441	1521	1644	1739
14	940	970	1156	1426	1735
26	924	1001	1129	1254	1658
32	1035	1078	1253	1393	1617
18	848	844	949	1504	1588
10	916	907	1066	1118	1546
37	997	965	1184	1322	1473
33	823	914	1006	1145	1470
48	721	775	965	1071	1319
3	886	918	1033	1191	1316
15	769	869	956	967	1197
17	858	797	951	977	1098
40	582	744	724	901	1097
2	736	782	910	987	1004
41	757	722	788	969	929
30	600	621	639	786	920
29	534	539	569	624	873
7	933	947	984	1154	852
4	578	661	682	669	830
16	736	530	614	620	806
24	546	563	643	673	791
5	585	629	719	924	752
22	591	577	586	690	751

TABLE NO. 8

ENGINE COMPANY RESPONSES

Co. No.	1964	1965	1966	1967	1968
8	620	659	788	850	743
6	508	515	569	599	715
39	468	554	619	653	705
46	601	588	608	646	675
49	497	581	573	597	635
44	533	551	599	565	627
28	528	470	330	390	607
20	453	453	407	457	526
36	495	508	529	487	508
45	423	444	480	490	487
1	315	356	382	414	442
47	324	363	405	350	440
23	306	331	336	377	408
35	266	273	241	266	354
19	164	160	168	135	181
9	163	179	165	175	169
Total			40,774	46,653	53,917
Average	739	782	867	993	1147

TABLE NO. 8

TRUCK COMPANY RESPONSES

Co. No.	1964	1965	1966	1967	1968
5	1296	1361	1636	1939	2589
6	1101	1241	1376	1853	2174
17	1085	1135	1673	1905	2017
9	1096	1104	1365	1549	1815
15	995	1089	908	1277	1803
7	886	958	1038	1417	1673
10	711	785	931	1067	1503
11	931	1006	1177	1211	1435
1	827	940	968	1054	1265
3	817	869	964	1139	1192
12	481	581	603	781	1036
4	631	670	712	769	813
13	500	520	561	551	756
2	518	560	596	674	735
19	360	389	473	586	719
8	424	446	400	523	624
18	375	455	564	478	550
14	309	330	410	432	422
20	283	235	273	228	343
16	207	237	250	251	297
Totals			16,878	19,684	23,761
Average	692	745	843	985	1188

TABLE NO. 8

HOSE TENDER RESPONSES

Co. No.	1964	1965	1966	1967	1968
4	717	751	785	927	1039
6	456	429	509	614	720
1	177	219	241	236	265
5	1006	1132	1379	1650	
3	275	395	511	479	
7	445	417	510	315	
8	266	270	314	217	
Totals				4,438	2,024
Averages	477	516	607	634	675

SALVAGE TRUCK RESPONSES

2	1781	1892	2203	2473	3088
4	1386	1559	1662	1974	2257
1	888	1018	1075	1280	1410
3	713	759	845	940	1026
Totals					7781
Averages			1446	1667	1945

RESCUE SQUAD RESPONSES

2	1506	1549	1587	1981	2468
1	1049	1195	1249	1434	1746
Totals					4214
Averages			1418	1707	2107

SEARCHLIGHT TRUCK

2	17	7	19	16	13
1	14	13	15	19	

WATER TOWER TRUCK RESPONSES

1	2	1	5	1	2
3	3	1	2	2	
4			1		

TABLE NO. 8

SERVICE SQUAD

Co. No.	1964	1965	1966	1967	1968
1	51	45	48	33	40

FIREBOAT RESPONSES

1	234	235	246	226	272

TABLE NO. 9

GREATER ALARM FIRES - 4ths & 5ths from 1964 through June 1969

Date	Day	Box	Time	Address	Occupancy
2/8/64	Saturday	4/4 1456	0156	124 Turk St.	Hotel
3/24/64	Tuesday	5/5 5423	1818	2159 Mission	Apartments
3/25/64	Wednesday	5/5 1454	2011	55 Taylor	Restaurant
9/3/64	Thursday	4/4 2351	1835	1950 16th St.	Glue Mfg.
9/4/64	Friday	5/5 945	1938	2742-70 Taylor	Restaurant
0/13/64	Sunday	4/4 3213	0704	145 Fell St.	Hotel
1965					
3/7/65	Sunday	4/4 1456	0357	1440 Jones	Apartments
3/27/65	Saturday	4/4 1464	2349	1190 Pine	Apartments
5/12/65	Wednesday	4/4 2136	1618	390 1st St.	Elec. Mfg.
10/30/65	Saturday	4/4 5812	1607	2099 Bryant	Furn. Mfg.
12/17/65	Friday	4/4 7136	0256	4533 Calif.	Apartments
1966					
1/11/66	Tuesday	4/4 1314	2022	660 Calif.	Church
2/14/66	Monday	4/4 1312	0511	33 Wentworth	Hall
3/1/66	Tuesday	4/4 2314	2333	553-55 Natoma	Flats
4/8/66	Friday	5/5 5446	0253	2482 Mission	Cloth. Store
4/9/66	Saturday	4/4 2252	2255	553-55 Natoma	Flats
4/28/66	Thursday	5/5 2173	1804	625 3rd St.	Warehouse
5/22/66	Sunday	5/5 2465	0012	698 Minnesota	Warehouse
6/26/66	Sunday	4/4 7314	1453	1000 Pt. Lobos	Sutro's
8/28/66	Sunday	5/5 2533	2226	2570-2 3rd St.	Hotel
10/13/66	Thursday	4/4 2313	1109	349-7th St.	Radiator
12/29/66	Thursday	4/4 3124	1830	1715 Polk St.	Hardware
1967					
1/28/67	Saturday	4/4 2122	1938	310 Fremont	Art Gallery
3/11/67	Saturday	4/4/1845	2107	690 Beach St.	Warehouse
7/18/67	Tuesday	4/4 4253	1828	2829 Calif.	Market
10/3/67	Tuesday	4/4 6823	0637	Pier 80	Pier
11/9/67	Thursday	4/4 5216	2154	159 14th St.	Warehouse
11/19/67	Sunday	4/4 3313	0424	331 Octavia	Apartments
12/13/67	Wednesday	4/4 1462	0047	630 Geary	Hotel

TABLE NO. 9 pg. 2

GREATER ALARM FIRES

Date	Day	Box	Time	Address	Occupancy
1968					
1/20/68	Saturday	4/4 3435	0001	2205 Sacramento	Apartments
5/28/68	Tuesday	4/4 6437	0246	3rd & Arthur	Pier 90
6/9/68	Sunday	4/4 2177	2212	245 Clementina	Warehouse
6/27/68	Thursday	4/4 5826	0523	534 Treat Ave.	Warehouse
7/22/68	Monday	4/4 5432	0307	515 Treat Ave.	Warehouse
8/20/68	Tuesday	3/3 5432	0418	500 Treat Ave.	Warehouse
11/28/68	Thursday	4/4 5434	0433	2252 Mission	Curio Shop
12/22/68	Sunday	4/4 1299	2151	228 Post St.	Dept. Store
1969					
3/4/69	Tuesday	4/4 1215	2350	1431-61 Sansome	Warehouse
4/22/69	Tuesday	4/4 7114	0150	342-44 Arguello	Dwellings
5/1/69	Thursday	4/4 6457	0752	3801 3rd St.	Meat Co.
5/16/69	Friday	4/4 3411	1556	1167-69 Turk	Vacant Bldgs.
6/29/69	Sunday	5/5 2374	1718	1404-34 3rd St.	Warehouse

APPENDIX

Composite Reorganization for Fire Stations, Companies and Manpower Assignment

Fire Station Location Criteria

Suggested Two-Bay Station Arrangement, Plate 21

Estimated Grading Effect of Recommendations

TABLE NO. 10

COMPOSITE REORGANIZATION

FOR

FIRE STATIONS

COMPANIES

MANPOWER ASSIGNMENTS

Note: Station and company numbers indicate existing; letters indicate new stations and re-organized companies. See map at back of report for location of proposed new station locations.

EXISTING			CHANGES		
Station No.	Company Type & No.	Manpower On Duty	Station Disposition	Company Disposition	Manpower On Duty
1.	Eng. 1	5	Keep	Keep	6
	Truck 13	6	(at new	Keep	6
	Hose Tr. 1	4	location)	Sell	
	Sal. 3	1		Keep	4
	Res. 1			Keep	5
				Add Eng.	5
2.	Eng. 2	5	Sell	Reallocate	
3.	Eng. 3	5	Sell	Reallocate	
	Truck 3	6		Reallocate	
4.	Eng. 4	5	Sell	Reallocate	
5.	Eng. 5	5	Sell	Reallocate	
	Truck 2	6		Reallocate	
6.	Eng. 6	5	Sell	Reallocate	
	Sal. 1	4		Reallocate	
7.	Eng. 7	4	Keep	Keep	5
8.	Eng. 8	5	Sell	Reallocate	
	Truck 4	6		Reallocate	
9.	Eng. 9	5	Keep*	Reallocate	
	Fire Boat 1	5		Keep	5
10.	Eng. 10	5	Keep	Keep	6
	Hose Tr. 6	1		Sell	
	Sal. 4	4		Reallocate	
	Truck 7	6		Keep	6

TABLE NO. 10 pg. 2

EXISTING			CHANGES		
Station No.	Company Type & No.	Manpower On Duty	Station Dispostion	Company Disposition	Manpower On Duty
11.	Eng. 11	5	Keep	Keep	5
	Truck 11	6		Keep	6
13.	Eng. 13	5	Sell	Reallocate	
	Truck 11	6		Reallocate	
14.	Eng. 14	5	Keep	Keep	6
				Add Truck	6
				Add Rescue	4
15.	Eng. 15	5	Keep	Keep	6
	Sal. 2	4		Keep	4
	Res. 2	5		Keep	4
				Add truck	6
				Add eng.	5
16.	Eng. 16	4	Sell	Reallocate	
17.	Eng. 17	5	Keep	Keep	6
	Truck 1	6		Keep	6
	Hose Tr. 4	1	Sell	Add Sal.	4
18.	Eng. 18	4	Sell	Reallocate	
19.	Eng. 19	4	Rebuild	Keep	5
	Air Comp. 1			Keep	1
	Water Tr. 1			Sell	
20.	Eng. 20	4	Keep	Keep	5
	Truck 16	6		Keep	6
21.	Eng. 21	5	Keep	Keep	5
22.	Eng. 22	4	Keep	Keep	5
23.	Eng. 23	4	Sell	Reallocate	
	Truck 20	6		Reallocate	
24.	Eng. 24	4	Keep		5
25.	Eng. 25	5	Keep	Keep	5
26.	Eng. 26	5	Sell	Reallocate	
	Truck 10	6		Reallocate	
27.	Eng. 27	5	Keep	Keep	5
	Truck 6	6		Reallocate	

TABLE NO. 10 pg. 3

EXISTING			CHANGES		
Station No.	Company Type & No.	Manpower On Duty	Station Disposition	Company Disposition	Manpower On Duty
28.	Eng. 28	5	Keep	Keep	6
29.	Eng. 29	5	Keep	Keep	5
	Fuel Unit	0		Keep	0
30.	Eng. 30	4	Keep	Keep	5
	Truck 19	6		Keep	6
32.	Eng. 32	4	Sell	Reallocate	
33.	Eng. 33	4	Sell	Reallocate	
34.	Eng. 34	5	Sell	Reallocate	
	Truck 5	6		Reallocate	
35.	Eng. 35	5	Sell	Reallocate	
	Truck 8	6		Reallocate	
	Hose Tr. 4	1		Sell	
	Light W. 1	1		Reallocate	
36.	Eng. 36	4	Sell	Reallocate	
	Truck 14	6		Reallocate	
37.	Eng. 37	4	Sell	Reallocate	
	Truck 9	6		Reallocate	
38.	Eng. 38	5	Keep	Keep	5
39.	Eng. 39	4	Sell	Reallocate	
40.	Eng. 40	5	Keep	Keep	5
	Truck 12	6		Keep	6
41.	Eng. 41	5	Keep	Keep	5
42.	Eng. 42	5	Sell	Reallocate	
43.	Eng. 43	4	Keep	Keep	5
				Add Truck	6
44.	Eng. 44	4	Keep	Keep	5
	Truck 18	6		Keep	6
45.	Eng. 45	4	Sell	Reallocate	
46.	Eng. 46	5	Rebuild	Keep	5
47.	Eng. 47	4	Sell	Reallocate	

TABLE NO. 10 pg. 4

EXISTING			CHANGES		
Station No.	Company Type & NO.	Manpower On Duty	Station Disposition	Company Disposition	Manpower On Duty
48.	Eng. 48	4	Sell	Reallocate	
49.	Eng. 49	5	Sell	Reallocate	
Lower Case Airport Stations & Companies		15	Keep(2)	Keep	15
Total		382			248

*Modernize

TABLE NO. 10 pg. 5

NEW FIRE STATIONS

Location	Companies	Manpower On Duty
Pennsylvania & 22nd	Eng.	5
	Elev. Plat.	6
	Sal.	4
Oakdale & Lomis	Eng.	5
	Elev. Plat.	6
Bryant & 2nd	Eng.	6
	Eng.	5
	Elev. Plat.	6
	Light Wag.	1
Dwight & San Bruno	Eng.	5
Geary & 34th St.	Eng.	5
	Truck	6
Portola & Twin Peaks	Eng.	5
	Truck	6
	Total	71

FIRE STATION LOCATION CRITERIA

1. Stations should be so located in the congested downtown district and industrial areas so that there is no section over 3/4 mile response distance (varying between ½ and 3/4 mile). There would be some variation to this standard in fringe areas where the fire fighting problems are somewhat diminished. This degree of concentration of fire stations anticipates a measure of unusual traffic congestion, railroad interferences, and slowdown due to terrain.

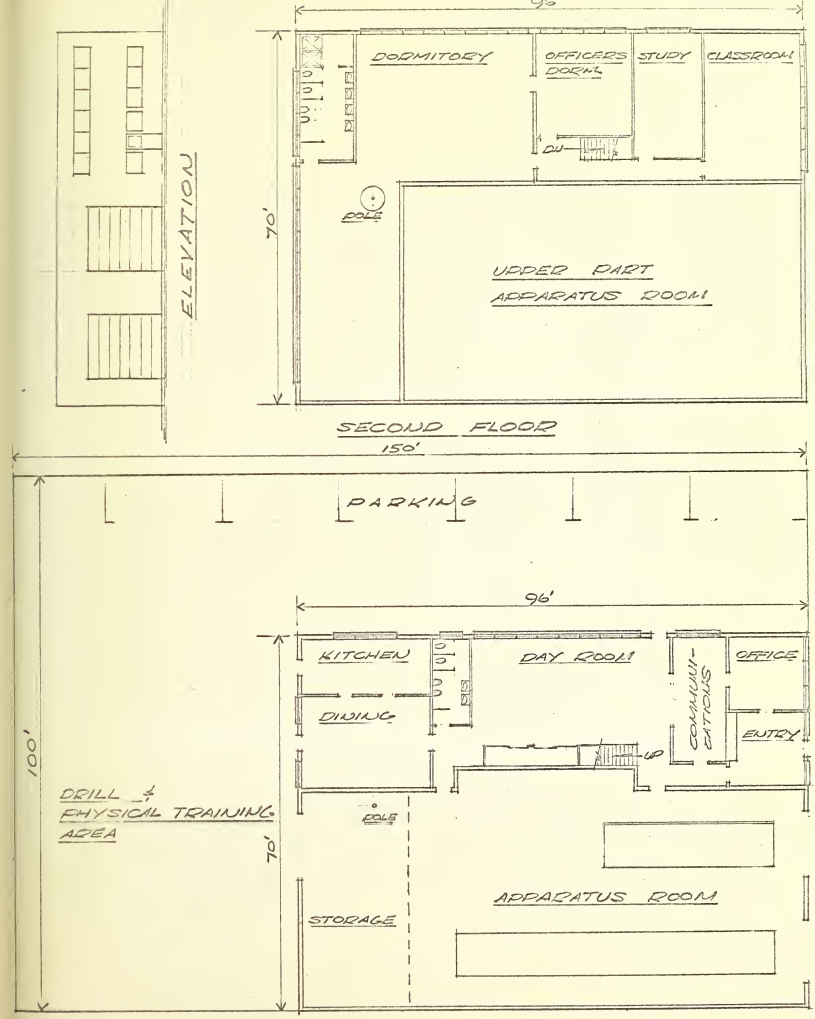
2. Stations in other areas should be so located so that no section is over 1½ miles (varying between 1 and 1½ miles). Congested districts, high rise apartment districts, and individual large buildings should be within the 1 mile response area; however 2-3-story residential and minor business areas can be adequately served if response distances are not over 1½ miles.

3. Terrain presents a problem in response time in several areas of the city. In most cases, by proper station location, this impairment can be largely overcome without extra stations. In two areas of the city this has resulted in extra stations needed; downtown and center city residential area. Two extra stations should be provided in the downtown district to assure the desired prompt response. The center city residential response is complicated by both steep terrain and winding streets -- one additional station is needed to compensate. Other areas of the city are reasonably flat or stations can be positioned so as to not impair the response coverage.

4. The preceeding 3 points of consideration for locating fire stations essentially have considered the coverage of companies operating out of the station or the travel time

of the first arriving company. Of considerable importance is the concentration of companies for major fires in the area. Each area of the city would have different concentration requirements based on the fire problem of the area. The concentration needed is based on the requirements of the A.I.A. as presented in Plates Nos. 19 and 20, although variations have been made where individual study has indicated a greater or lesser degree of protection is desirable.

5. Stations should be located to make maximum use of the street structure. Many times this is not compatible with achieving optimum coverage. It is therefore necessary to locate stations by considering both variables of optimum coverage and street access. This study has not endeavored to pinpoint location of new stations, but has proposed an area in which the station should be located. Considerably more study of land costs, street access, future developments, etc., is needed before a final site is selected.



SUGGESTED TWO-BAY STATION ARRANGEMENT

Plate No. 21

TABLE NO. 11

ESTIMATE OF GRADING EFFECT

OF RECOMMENDATIONS

City San Francisco Date October, 1969

Date Graded 2-66 Graded By AIA Information Furnished By AIA

FIRE DEPARTMENT

Item	Description	Deficiency Points	Estimated Change
1.	Number of Officers	5	-3
2.	Number & Qualification of Operators	3	-1
3.	Qualifications of Officers	1	
4.	Chief's Tenure of Office	2	
5.	Appointment and Promotion of Officers	2	
6.	Enlistment Requirements	1	
7.	Retirement Requirements	3	
8.	Number of Hose & Engine Companies & Apparatus	0	
9.	Number of Ladder Companies & Apparatus	0	
10.	Distribution of Companies	1	
11.	Manning of Companies	3	
12.	Manual Strength of Companies for High-Value District	2	
13.	Pumper Capacity	0	
14.	Reserve Pumpers	0	
15.	Condition of Apparatus	9	
16.	Fireboats	35	-23
17.	Powerful and Special Stream Appliances	1	
18.	Small Steam Appliances	9	
19.	Reserve Hose Carrying Vehicles	0	
20.	Hose	0	
21.	Condition of Hose	5	
22.	Emergency Equipment	3	
23.	Minor Equipment	5	
24.	Radio Communication	0	
25.	Repair Facilities	5	
26.	Salvage Appliances	3	
27.	Fire Stations and Fuel	8	-2
28.	Regulations and Discipline	8	
29.	Training	10	-5
30.	Response to Alarms	0	
31.	Fire Methods	18	-3
32.	Conditions Affecting Fire Dept. Operations	22	
33.	Building Inspections	15	
34.	Records	1	
	Total	188	-37

TABLE NO. 11 pg. 2

FIRE PREVENTION

Item	Description	Deficiency Points	Estimated Change
1.	Authority & Control	14	-4
2.	Supplemental Fire Prevention Activities	7	-3
3.	Flammable or Compressed Gases	11	-2
4.	Flammable Liquids	34	-8
5.	Special Hazards	37	-14
6.	Miscellaneius Hazards	24	-11
7.	Electrical Wiring and Equipment	10	-2
	Total	137	-43

SUMMARY

	Fire Department Section	Fire Prevention Section
Present Deficiency Points	188	137
Estimated Deficiency Points (result of recommendations)	151	94
Net Reduction	37	43

4,000
SOUTH
BASIN

FORT FUNSTON
DE LA